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ABSTRACT

Seven original research papers by faculty and students of the Linguistics Department and other related departments of the University of Kansas are presented. The titles and authors are as follows: "Particles in Tojolabal Mayan Discourse" (Jill Brody); "One Hundred Years of Lakota Linguistics (1887-1987)" (Willem J. de Reuse); "Lexical and Phrasal Phonology of Yoruba Nouns" (Antonia Y. Folarin); "Some Klamath-Sahaptian Grammatical Correspondences" (Noel Rude); "A Note on Hopi Consonant Gràdation" (David Leedom Shaul); "Word Order in Klamath" (Karen Sundberg); "A Comparative Sketch of Pueblo Languages: Phonology" (Yukihiro Yumitani). A list of the cumulative contents of volumes 1-12 of the Kansas Working Papers in Linguistics is included. (LB)

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edited by

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PARTICLES IN TOJOLABAL MAYAN DISCOURSE

Jill Brody

Abstract: Modal clitic in Tojolabal Mayan cliticize to the first element of the clause. Evidentiality particles indicate the speaker's commitment to the truth of the statement, and temporal/aspectual particles indicate expectability, precedence and durativeness. They function not only to place the speaker in relation to the time and truth of what is said, but also aid in discourse cohesion. The reportative particle b'i occurs in foreground clauses in stories.

0. Introduction

Like other Mayan languages (e.g., Mam (England) and Tzutujil (Dayley), and others (DuBois)), Tojolabal has a set of modal particles (Furbee 1976). In Tojolabal, these optionally cliticize to the first non-fronted element of clauses, usually the verb (1), a temporal marker (2), or an adverbial (3) (see Steele 1977 on sentence-second position).

(1)[1] ay-0 kristiano / 0-b'oy-ow-0-e7=ta ja b'a
BE-3a PEOPLE com-DIG-tvm-3a-3epl=already det loc

y-oj niwan na7itz=i.
3e-INTERIOR BIG HOUSE=npt
'There are people who have already dug inside the big house.'

(2) pes ti=b'i 0-s-le7-aw-0 modo jastal oj
well then=rpt com-3e-SEEK-tvm-3a WAY how fut

s-k'ul-uk-0 b'a y-ojol s-lukum ja ayin=i.
3e-DO-3a loc 3e-INTERIOR 3e-STOMACH det ALLIGATOR=npt
'Well then (it is said) he looked for how to do it from inside the alligator.'

(3) pwes jach=b'i 0-y-al-aw-0--kan ja winik ma7
well THUIS=rpt com-3e-SAY-tvm-3a--STAY det MAN rel

jel x-ok'-0 ja y-ora cham-0 ja s-che7um=i.
VERY inc-CRY-3a det 3e-TIME DIE-3a det 3e-WIFE=npt
'Well, thus (it is said) is what was told by the man who cried so much when his wife died.'

These particles represent values along various modal, temporal, and aspectual continua, including evidentiality, realis/irrealis, expectability, sequence, durativeness, and perfectivity. The intersection of these continua forms a range of operation for these particles that, among other things, allows orientation of the

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speaker's attitudes toward what is being said, permits subtle modifications of orientation in time, and, on the discourse level, also expresses coherence relations between propositions.

1. The Particles

The modal clitic particles of Tojolabal are listed in (4). There are other particles, but they pattern differently, and I will not discuss them here. The modal clitic particles fall into two general categories: evidentiality particles, and temporal/aspectual particles. There is some overlap of modality features between these two categories, but there are several reasons to maintain their distinctiveness, as will be discussed.

(4) Modal Clitic Particles

temporal/aspectual particles		evidentiality particles	
xa	now	ni	emphatic
ta	already	b'i	reportative
to	still	k'a	conditional
xta	durative	ma/ama	dubitative, question
cha/cho	repetitive		

Modal particles may occur in combinations, with the following restrictions: 1) that there be only two in the sequence, 2) that the two particles be different, and 3) that the second particle be a) one of the particles of evidentiality or b) cha/cho. Thus the temporal/aspectual particles are closer to the verbal complex than are the evidentiality particles. Generally, sequencing involves one temporal and one evidential particle. cha/cho is the only temporal/aspectual particle that can co-occur with all the other temporal particles. ni=b'i is the only combination of evidentiality particles that occurs with any frequency, and it is restricted to particular contexts. The only other combination of evidentiality particles is in the highly emphatic affirmative statement in (5).

(5) meran-0=ni=k'a=a.
TRUE-3a=emp=con=clt
'It is definitely really true.'

2. Continuum of Evidentiality

The evidentiality particles form an array along the range of degree of responsibility taken for the veracity of the statement to which they are attached.

The use of ni indicates the speaker's emphatic affirmation of the truthfulness of the assertion, often in response to doubt expressed about the statement. Thus, the question in (6) can be responded to appropriately using ni.

(6) Q: haw-e7n=*ama*?
2e-SELF=*dub*
'Is/was it you?'

A: k-e7n=*ni*=*a*.
1e-SELF=*emp*=*clt*
'It is/was I.'

ni is the only modal particle that is obligatorily followed by the clause terminal particle =*a*, at the end of the clause.[2]

The use of the reportative particle *b'i* entails a restriction of the speaker's full commitment to the veracity of the statement. Its use indicates that the speaker has heard what is being stated, but has not personally witnessed it. While this particle occasionally occurs in conversation, the highest frequency context of its use is in the telling of traditional folktales, where related events are marked by the reportative as not having been experienced directly. Many examples of the use of *b'i* appear in the text segment in the appendix. The story-teller uses *b'i* to withdraw from claiming the highest degree of identification with the statement, placing that responsibility upon those from whom he has heard the tale, or on the ancestors, or perhaps even upon the community as a whole. The truth of the statement to which the reportative is attached is not doubted; it is simply not directly claimed, and is attributed to another authority.

A much further removal from taking direct responsibility is respresented by the use of the conditional *k'a*. The veracity of the statement to which *k'a* is attached is not denied or even questioned, but neither is it claimed. The conditional places the statement in the realm of the hypothetical and irrealis. Thus in a quoted conversation between a merchant and a customer in the market we have an example of the conditional.

(7) pero puro=*k'a* tza7ub'al wa-x-k-a7--aw-i7-0
BUT ONLY=*con* CHOSEN pro-inc-1e-GIVE--2e-TAKE-3a

ti oj kan-uk-0=a ja b'a ala-yihik=*xa*=i.
then fut REMAIN-sbj-3a=clt det loc dim-RIPE=*now*=npt
'But if I give it to you picked over, then only the little ripe ones will remain.'

A hypothetical situation is outlined, where the truth of the statement is conditional, dependent upon the circumstances described holding. *k'a* is typically found in conditional clauses, but see (5) above.

The dubitative particle *ma*/*ama* explicitly questions the truth of the statement to which it is cliticized. The particle forms yes/no questions; these are answered not with equivalents of 'yes' and 'no', but by affirmed or negated predicates, as in (8); also, see (6) above.

(8) Q: ay-0=ma kajpe?
BE-3a=dub COFFEE
'Is there (any) coffee?'

A: meyuk (mi-ay-uk-0).
(neg-BE-subj-3a)
'No.'

Q: oj=ma waj-an?
fut=dub EAT-2a
'Will you eat?'

A: oj=o.
fut=futerm
'Yes.'

The four modal clitic particles of evidentiality span the range of responsibility taken for the veracity of the statement from emphatically affirming it (ni), to placing the authority in respected others (b'i), to the conditional with truth dependent on the interpretation of the clause containing (k'a), to questioning the truth (ma/ama). Denial might logically be expected to participate in this continuum, but negation is not handled through the use of clitic particles in Tojolabal. The continuum of evidentiality is generally divided into two levels of commitment: realis (ni and b'i) vs. irrealis (k'a and ma/ama). It is worthy of note that the nature of the speaker's relationship to the truth forms a part of many (though not all) statements. While the use of b'i characterizes folk tales, the other clitics are not confined to any particular genre. In summary, the use of the modal clitic particles of evidentiality orients the statement in relation to the speaker's commitment to its veracity.

3. Continuum of Temporal/Aspectual/Modal Orientation

The modal clitic particles of temporal orientation are arrayed along intersecting aspectual, temporal, and modal continua. The temporal range is defined by precedence, the aspectual by durativeness, and the modal range is defined by the level of expectability that the action in the statement has for the speaker.

Taking the temporal feature first, three of the temporal orientation particles subdivide the tense/aspect range obligatorily indicated on the verb, as shown in (9).

(9)

	completive	incompletive	future	sequence (ti)
xa		*	*	*
ta	*			
to	*			

The particle to roughly translates as 'still', as shown in (10).

(10) ay-0=to kajpe.
BE-3a=still COFFEE
'There is still coffee.'

Its use indicates a continuation from the past through the present.

The particle ta roughly translates as 'already', and indictes an action that has taken place previously, as in (11).

(11) 0-waj-0=ta.
com-GO-3a=already
'He/she already went.'

The particle xa means 'now', and is used to underscore the currency of the action, as in (12).

(12) ay-0=xa kajpe.
BE-3a=now COFFEE
'There is coffee now.'

In addition to indicating currency, the use of xa entails the sequentiality of the action. xa marks what normally, naturally, and consequently falls next in sequence. An example of this use of xa appears in sentence #3 in the text in the appendix; the sequence of actions is that 1) the people went into the caves, and then 2) when they came out they had tails. Another example appears in sentence #10 in the appendix; here the sequence of actions is 1) the last creation was killed with water, but 2) the next will be killed with fire. The sequentiality of xa is emphasized when it cliticizes to the introductory particle ti 'then', as in (13). ti=xa commonly introduces sequential events. Another sequential use of xa is in the topicalization construction, shown in (14), where it cliticized to the determiner ja to indicate change of topic in discourse (Brody in press).

(13) ti=xa wa-x-och--s-le7-0-e7
then=now pro-inc-BEGIN--3e-SEEK-3a-3epl

ja tak'in=a.
det MONEY=clt
'Then they begin to look for the money.'

(14) ha=xa ma7 wa-x-s-chon-ow-0 ti
det=now rel pro-inc-3e-SELL-tvm-3a then

wa-x-y-al-aw-0...
pro-inc-3e-SAY-3a
'As for the one who sells, then she says...'

Thus, on a time scale, the temporal orientation particles move from the past (ta) to the next in sequence (xa), to the ongoing (to). By contrast with xa, then, the particles to and ta indicte events that are out of the normal sequence, in that they continued beyond the expected time (to) or began earlier than expected (ta).

As aspectual duratives, the particles cha/cho and xta cross-cut the temporal sequencing. As mentioned above, cha/cho has more freedom of placement than the rest of the particles in the set. In order to distinguish between cha/cho and xta, and to explain the details of the operation of the temporal orientation particles in relation to tense/aspect, it is necessary to understand their modal nature. They also participate in the continuum of speaker's expectation, that is, the degree of expectability that the statement represents for the speaker. The modal continuum of expectability defines a range from action that is expectable or neutral in expectation for the speaker to action that is surprising to the speaker or out of sequence in the normally expected course of events. The feature of expectability hence contributes a modal value to actions occurring in the temporal and aspectual arenas.

To return to the durative particles, cha/cho indicates that the repeated action was either expected or neutral in relation to expectation, as in #18 in the text sequence in the appendix. xta indicates an action that was repeated unexpectedly or one that occurs with an unexpected intensity. In (15), we see xta used forcefully in the course of a quoted bargaining transaction in the market. When asked to sell her commodity for a lower price, the vendor replies that she won't, because the work to grow the crop is very difficult.

(15)
a. x-s-k'an-aw-0=xta ta mi x-el-0 a-gana.
inc-3e-WANT-tvm-3a=dur if neg inc-EXIT-3a 2e-WILL
'It really requires that you don't get discouraged.'

b. x-s-k'an-aw-0=xta mi x-yajb'-iy-0
inc-3a-WANT-tvm-3a=xta neg inc-HURT-ivm-3a

ja-pat-ik.
2e-BACK-ndr
'It really requires that one's back not get hurt.'

For the temporal/aspectual particles xa, ta, and to, the features of expectability and sequencing distinguish xa as indicative of normal current action or action proceding in sequence from ta and to, which both mark the action as out of sequence and unexpected. The chart in (16) distinguishes all the modal clitic particles according to the tense-aspect-modality features discussed.

16. Tense-aspect-modality features

	cha	xta	xa	ta	to	ni	b'i	k'a	ma
evidentiality (1 high, 4 low)						1	2	3	4
realis						+	+	-	-
expectability (sequentiality)	+	-	+	-	-	-			
precedence (perfectivity)			-	+	-				
durativeness	+	-	-	-	+				

Since the evidentiality particles for the most part map different features than do the temporal/aspectual particles, it would seem that there are two separate sets of particles. There is also, however, some overlap of features. The emphatic affirmative evidential ni has a counter-to-expectation element to it. This is especially seen in one context where ni is commonly found: the emphatic assertion of a statement in response to its having been questioned, as in (5), (6) and (8) above. It should be noted, however, that ma/ama does not imply question with the expectation of either a negative or a positive answer. The counter-to-expectation feature of ni is what allows it to co-occur with the reportative b'i in contexts like sentence #6 in the text in the appendix, where the clause that follows the one beginning with a7nima 'even though' contains both the reportative and the emphatic ni, marking the surprising nature of the outcome. Sentences #5 and #18 in the text in the appendix shows a similar example.

4. Discourse: fourground and background

In addition to coding tense-aspect and modality, both sets of particles also participate in coding the discourse coherence relations of propositions in sequence. In narrative, the particles are associated with foreground clauses, which relate the main points and events of the story. Background clauses, by contrast, contain asides and other information the speaker is offering that is not central to the story. This pattern is clearest in the most stylized form of Tojolabal narrative, the folk tale. The reportative particle b'i carries the heaviest foreground load, though the other particles appear as well. In the segment from a Tojolabal version of the creation in the appendix, the particles are underlined, and the foregrounded clauses they are associated with are indicated. Background information may be repeated background, as in sentences #1, #2, #5, #11, or asides as in #8, #13, #14.

5. Conclusion

It is not contrary to general linguistic expectation that the features of tense, aspect, and mode be interactive, or that the same particles code discourse cohesiveness as well. Additionally, on a purely speculative note, it seems to me to be fitting that in the historical Mayan context of obsession with time on the level of the calendar, and the Mayan subjectivization of time through the auguries of the days, that the temporal and aspectual range be closely intertwined with the modal and evaluatory range.

APPENDIX Text Segment from Creation Story

1. ja wego wa-x-y-al-aw-0-e7 ja kristiyano jumasa ja
det now pro-inc-3e-SAY-tvm-3a-3epl det PEOPLE ALL det

b'a lame it=i ke ja chante7 jumasa b'a witz
det GENERATION THIS=npt rel det ANIMAL ALL loc FOREST

ja wego puro-0=b'i kristiyano ja najate7.
det now ALL-3a=rpt PEOPLE det LONG AGO
'Now all the people in this generation say that all the animals in the forest now (it is said) were people long ago.'

2. wa-x-y-al-aw-0-e7 ja kristiyano jumasa ja wego ke
pro-inc-3e-SAY-tvm-3a-3epl det PEOPLE ALL det now rel

ja ma7-tik b'ajtan winik ja s-b'aj najate7
det rel-pl FIRST MAN det 3e-SELF LONG AGO

0-ch'ak=b'i--och-uk-e7 k'e7en ja y-ora 0-ch'ak-0
com-FINISH=rpt--ENTER-sbj-3apl CAVE det 3e-TIME com-FINISH-3a

ja satk'inal=i.
det WORLD=npt
'All the people now say that those who were the first men long ago all went into caves when the world was destroyed.'

3. ja7=b'i y-uj ja yajni 0-waj--el-uk-e7=i
cl-rpt 3e-relN det when com-GO--EXIT-sbj-3apl-npt

ay-0=xa=b'i s-nej-e7 0-el-iy-e7--k'e7n
BE-3a=now=rpt 3e-TAIL-3pl com-EXIT-ivm-3a-l--UPWARD

ja b'a y-oj k'e7en=i.
det loc 3e-INTERIOR CAVE=npt
'(It is said) that it is for this reason when they went out (it is said) they now had tails (when) they came up out of the inside of the cave.'

4. i tuktukil=b'i chante7 0-el-iy-e7--k'e7n=i
and DIFFERENT=rpt ANIMAL com-EXIT-ivm-3apl--UPWARD=npt

ja ora jaw=i.
det TIME THAT=npt
'And (it is said) that they were different animals when they came up out that time.'

5. ja7-0 y-uj ja wego wa-x-y-al-aw-0-e7 ja yajni
cl-3a 3e-relN det now pro-inc-3e-SAY-tvm-3a-3epl det when

la-ch'ak-tik=i mi=ni=b'i june7 ma7 oj kan-0 libre=a.
inc-FINISH-1aplin=npt neg=emp=rpt ONE rel fut STAY-3a FREE=clt
That's why they say that when we are destroyed, no one will be left.

6. a7nima=b'i la-och-0--k'e7en oj=ni=b'i
EVEN THOUGH=rpt inc-ENTER-2a--UPWARD fut=emp=rpt

ch'ak-uk-tik=a.
FINISH-1aplin=clt
'Even though we might go into caves, (it is said) we will really be destroyed.'

7. ja najate7 0-ch'ak=b'i--pax-uk-e7 chante7il ja
det LONG AGO com-FINISH=rpt--BECOME-sbj-3apl ANIMAL det

kristiyano jumasa porke sok=b'i ja7 0-ch'ak-iy-e7.
PEOPLE ALL because with=rpt WATER com-FINISH-ivm-3apl
Long ago (it is said) all the people became animals because (it is said) they were destroyed by water.

8. ja7-0 y-uj mi 0-ch'ak-iy-e7 jun tiro y-uj
cl-3a 3e-relN neg com-FINISH-ivm-3apl ONE LOTS 3e-relN

ja ja7=i.
det WATER=npt
For this reason they weren't all finished by the water.

9. ay-0=to=b'i b'a wa-x-y-a7-0--kan xe7n takin.
BE-3a=still=rpt loc pro-inc-3e-MAKE-3a--STAY PIECE DRY
'(It is said) there were pieces that stayed dry.'

10. pero ja lame kristiyano wego oj=b'i ch'ak-0
but det GENERATION PEOPLE now fut=rpt FINISH-3a

spetzanil porke sok=xa=b'i k'ak' oj ch'ak-uk-0
EVERYONE because with=now=rpt FIRE fut FINISH-sbj-3a

ja satk'inal=i.
det WORLD=npt
'But the present creation (it is said) will all be destroyed because next the world will be destroyed with fire.'

11. wa-x-y-al-aw-0-e7 ja kristiyano jumasa ja
pro-inc-3e-SAY-tvm-3a-3epl det PEOPLE ALL det

wego ke ja kristiyano jumasa ja s-b'aj najate7
now rel det PEOPLE ALL det 3e-SELF LONG AGO

chikan jastal ja s-modo-e7=i jach=b'i
ACCORDING TO how det 3e-WAY-3pl=npt THUS=rpt

0-ch'ak--pax-uk-e7 ja jastal s-modo ja chante7 jumasa
com-FINISH--BECOME-sbj-3apl det how 3e-WAY det ANIMAL ALL

ja wego.
det now
'The people now say that all the people long ago, according to their ways, thus they all became like the ways of the animals.'

12. ja pagre ja s-b'aj najate7 komo lek=b'i
det PRIEST det 3e-SELF LONG AGO since GOOD=rpt

wa-x-s-je7-aw-0 s-b'aj pero malo ja jas
pro-inc-3e-SHOW-tvm-3a 3e-SELF but BAD det what

wa-x-s-k'ulan-0 ja7-0 y-uj pa7ay=b'i 0-pax-iy-0.
pro-inc-3e-DO-3a cl-3a 3e-relN FOX=rpt com-BECOME-ivm-3a
'The priests long ago, since they showed themselves as good but what they did was bad, for this reason they became foxes.'

13. ja=xa ma7 jel manyoso tan chich=b'i 0-pax-iy-0
det=now rel VERY TRICKY DAMN RABBIT=rpt com-BECOME-ivm-3a

porke ja chich=i jel manyoso.
because det RABBIT=npt VERY TRICKY
'And as for he who was very tricky, (it is said) he became a damn rabbit, because rabbits are very tricky.'

14. mi x-yam-j-iy-0 wego y-uj ja tz'i=i.
neg inc-GRAB-pas-ivm-3a QUICKLY 3e-relN det DOG=npt
'He isn't caught easily by the dogs.'

...

18. pwes wa-x=cha=y-al-aw-0-e7 ja wego ja yajni
well pro-inc=rep=3e-SAY-tvm-3a-3epl det now det when

x-ch'ak-0 ja lame kristiyano it=i ta ay-0=k'a
inc-FINISH-3a det GENERATION PEOPLE THIS=npt if BE-3a=con

ma7 wa-x-och-0 k'e7en oj=ni=b'i ch'ak-uk-0=a
rel pro-inc-ENTER-3a CAVE fut=emp=rpt FINISH-sbj-3a=clt

porke mas=b'i jel yaj jun tiro oj jak-uk-0
because MORE=rpt VERY PAIN ONE LOTS fut ARRIVE-svj-3a

ja kastigo ja wego.
det PUNISHMENT det NOW
Well they also say now that when this creation is destroyed, if there are any who enter in caves, they'll be really destroyed, because (it is said) that the punishment will arrive with a lot of suffering this time.

ABBREVIATIONS

1	1st person
2	2nd person
3	3rd person
a	absolutive
clt	clause terminal
com	completive aspect
det	determiner
dim	dimunitive
dub	dubitative
emp	emphatic
e	ergative
fut	future
in	inclusive
inc	incompletive aspect
ivm	intransitive verb marker
loc	locative
npt	noun phrase terminal
pas	passive
pl	plural
pro	progressive
relN	relational noun
rel	relative
rep	repetitive
rpt	reportative
sbj	subjunctive
tvm	transitive verb marker
/	fronted clause boundary
-	morpheme boundary
=	clitic boundary
--	compound

NOTES

1. The orthography used is a practical transcription, where x represents /s/, ch represents /c/, j represents /h/, tz represents /¢/, and 7 represents glottal stop. ay-0 kristiano in this example is a fronted clause, as indicated by the /.

2. The clause terminal =a also marks the end of clauses of temporal sequence beginning with ti 'then'. See (13) for an example.

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ONE HUNDRED YEARS OF LAKOTA LINGUISTICS
(1887-1987)

Willem J. de Reuse

Abstract: This is an attempt at a comprehensive bibliography of published and unpublished books, articles, and materials relevant to the Lakota (Teton Dakota or Teton Sioux) language, with comments for most items. The period covered is from 1887, the date of Pilling's Bibliography of the Siouan Languages, to date (1987).

This bibliography is an attempt at a complete list of everything written on the Lakota language since the publication of

Pilling, James C. 1887. Bibliography of the Siouan Languages. BAE-B.5. Washington: Govt. Printing Office.

a century ago.

The items in that bibliography are thus excluded from this list, unless they have been reprinted or reviewed after 1887. Items included are books, pamphlets, articles, papers, theses, dissertations, published or unpublished, completed or in preparation, bearing fundamentally or marginally on the study of all linguistic aspects of the Lakota, (also called Teton Sioux or Teton Dakota) language.

It will be noted that this bibliography differs in scope from Pilling (1887) since it deals only with the Lakota dialect, and not with any of the other languages or dialects of the Dakotan or Sioux subdivision of Mississippi Valley Siouan (i.e. the Dakota and Nakota dialects, and the

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Assiniboine and Stoney languages), nor with other branches of the Siouan family. General reference works and bibliographies on the Dakota or Sioux are not included.

Most items are followed by some informal notes between square brackets. n.s. means that the compiler has not seen this item.

Abbreviations used are:

BAE-B	Bureau of American Ethnology Bureau
BIA	Bureau of Indian Affairs

The following is a chart of the correspondences between diacritics in the original titles and their computer equivalents; V stands for any vowel, C for any Consonant, and X for any letter.

Č	Cˆ
Cʿ	C<
Cˀ	C?
V́	V’
V̀	V‘
Ṽ	V~
V̨	V(
Xˈ	X|
Xʾ	X>
ḳ	k.
ŋ	n)

ṡ s.

I wish to thank all the people who have lent materials to me, including Richard Carter, Ken Miner, Patricia Shaw, and in particular David Rood and Allan Taylor for letting me browse in their Lakota library at the University of Colorado, and John Koontz for sending me a list of items.

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Anon. n.d. [Mimeo primer of 17 short texts, with English questions, and vocabulary, on loose pages of different colors.] [56 pp.; in possession of Dept. of Linguistics, University of Colorado, Boulder.]

Anon. n.d. [Mimeo pamphlet with two texts: To Ride Like the Wind / Kahwokya Oakanyanke and Try These! / Lena Iyut|a Yo.] [4 pp.; illustrated; seen Geraldine Florence Iron Whiteman's copy (daughter of Cleveland Iron Whiteman + and Theresa Mae LeDeaux). This copy was given to her by her aunt, presumably in the late seventies, in Pine Ridge, S.D.]

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Information on the program given on printout:
Programme 'TXTCNS'. 'Txtcns' is a concordance package consisting of three programmes:
'Txtct' creates citation/context/attestation records from text which contains sentence-identifiers and punctuation; it deletes comment records ('%*') and extra blanks.
'Txtcss' sorts the records created by 'txtct' according to the standard collating sequence.
'Txtco' formats and prints these records and accumulates statistical information.

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February 8, 1973. Copyright 1973.

Statistical information given on printout:
1083 pp.
Total number of types 6798
Total number of tokens 40355
Total number of hapax legomena 4346
Hapaxes/tokens 0.1077
Hapaxes/types 0.6393]

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Van Valin, Robert D., Jr. [1980.] Lexical Constraints on Dakota Clause Structure. Unpublished paper. [This was the first version of Van Valin (1985a); but actually almost a different paper, and still a quite interesting one.]

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LEXICAL AND PHRASAL PHONOLOGY OF YORUBA NOUNS

Antonia Y. Fọlarin

Abstract: This paper deals with a detailed analysis of nouns derived from Noun+Noun structures. These nouns are categorized into two types: Compound and Phrasal nouns. Assuming some of the basic principles of Lexical Phonology, it is argued that compound nouns should be derived in the lexicon, while phrasal nouns are derived in the syntactic component. Two types of compounding are also proposed.

Introduction

Derived nouns (i.e., polymorphemic nouns) in Yoruba can be subdivided into different categories. Some are derived by adding a prefix to a verb or a verb phrase, or by reduplicating the verb. In addition, some are derived from Noun+Noun structures. This paper focuses on the derivation of the latter types. It proposes a solution to the problems associated with the analysis of nouns derived from Noun+Noun structures (henceforth N+N structures). Previous analyses and their shortcomings are also discussed.

Problem

There are about five different types of N+N structures in Yoruba. Each type is exemplified below:

(1) a. ilé + tẹ́tẹ́ --> iléetẹ́tẹ́
'house' 'gambling' 'house of gambling'

b. apá + Dàda --> apáaDàda
'arm' 'name of a person' 'Dada's arm'

c. orí + Táíwò --> oríiTáíwò
'head' 'name of a person' 'Taiwo's head'

(2) a. ọmọ + obìrin --> ọmọobìrin
'child' 'woman' 'woman's child'

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	b. ẹ̀bá 'near'	+	odò 'river'	-->	ẹ̀bóodò 'near the river'
	c. ilé 'house'	+	Ẹbùn 'person's name'	-->	ilẹ́Ẹbùn 'Ebun's house'
(3)	a. ìwé 'book'	+	ilé 'house'	-->	ìwéelé 'tax receipt'
	b. ará 'someone'	+	ìlú 'town'	-->	aráàlú 'someone from the town'
	c. ilé 'house'	+	ìwé 'book'	-->	iléèwé 'school'
(4)	a. ọmọ 'child'	+	obìrin 'woman'	-->	ọmọbìrin 'girl'
	b. ojú 'eyes/face'	+	òde 'outside'	-->	ojúde 'open space'
	c. idì 'bottom'	+	ọkọ̀ 'vehicle'	-->	idìkọ̀ 'motor park'
(5)	a. ògbó 'elder'	+	ẹni 'person'	-->	ọ̀gbẹ́ni 'Mr'
	b. ọmọ 'child'	+	idan 'virgin'	-->	omidan 'Miss'
	c. ìlú 'town'	+	ètò 'arrangement'	-->	ìletò 'hamlet'

The division into types is based on the different phonological rules undergone by each of these subgroups. For example, the N+N constructions in (1) undergo the rule of vowel insertion which is formalized below in (6).

(6) Vowel Insertion Rule

$$\emptyset \;\text{-->}\; \underset{[\alpha F]}{V} \;/\; \underset{[\alpha F]}{V}\,]_{N} \;\text{---}\; [\text{-syl}]_{N}$$

The rule in (6) states that a vowel which is identical to the final vowel of the first noun is inserted between two nouns, if the second noun begins with a consonant. On the other hand, the structures in (2-5) undergo the rules formalized in (7-10) respectively.

(7) Regressive assimilation

$$V_1 \text{ --> } V_2 \ / \ \text{---}]_N \ {}_N[\, \underset{[-\text{high}]}{V_2}$$

Rule (7) states that the final vowel of the first noun becomes assimilated to the initial vowel of the second, if the initial vowel of the second noun is [-High]

(8) /i/ Assimilation rule

$$/i/ \text{ --> } [\alpha F] \ / \ \underset{[\alpha F]}{V} \Big]_N \Big[_N \text{---}$$

The above rule states that a vowel /i/ becomes assimilated to the entire features of a preceding vowel in a N+N structure.

(9) V_2 Deletion rule

$$V_2 \text{ --> } \emptyset \ / \ V_1\Big]_N \Big[_N \text{---}$$

Rule (9) states that the initial vowel of the second noun is deleted in a N+N structure, when the first noun ends with a vowel.

(10) V_1 Deletion rule

$$V_1 \text{ --> } \emptyset \ / \ \text{---}\Big]_N \Big[_N V_2$$

In the above rule, the final vowel of the first noun is deleted when the second noun in a N+N structure begins with a vowel.

Rule (6) only applies to the N+N structures in (1), since there is no other type of N+N structures where N_2 begins with a consonant. The problem, however, lies with the N+N structures in (2-5) and each of the applicable rules in (7-10). In order to derive the correct outputs in (2-5), rules (7), (8), (9), and (10) must apply respectively to the structures in (2), (3), (4), and (5). Nevertheless, it is observed that each of the rules in (7-10) is applicable to any of the structures in (2-5). There is no device that blocks the V_1 deletion rule, for instance, from applying to the wrong structures in (4). Similarly, the structural description of rule (7) is also met by the N+N structures in (4). The question is, "how can we constrain each of the rules in (7-10) from applying to the wrong structures in (2-5)?"

A solution based on the use of boundary symbols, as proposed in Chomsky and Halle (1968), will run afoul in this case because each of the structures in (2-5) will have an identical underlying representation schematized below.

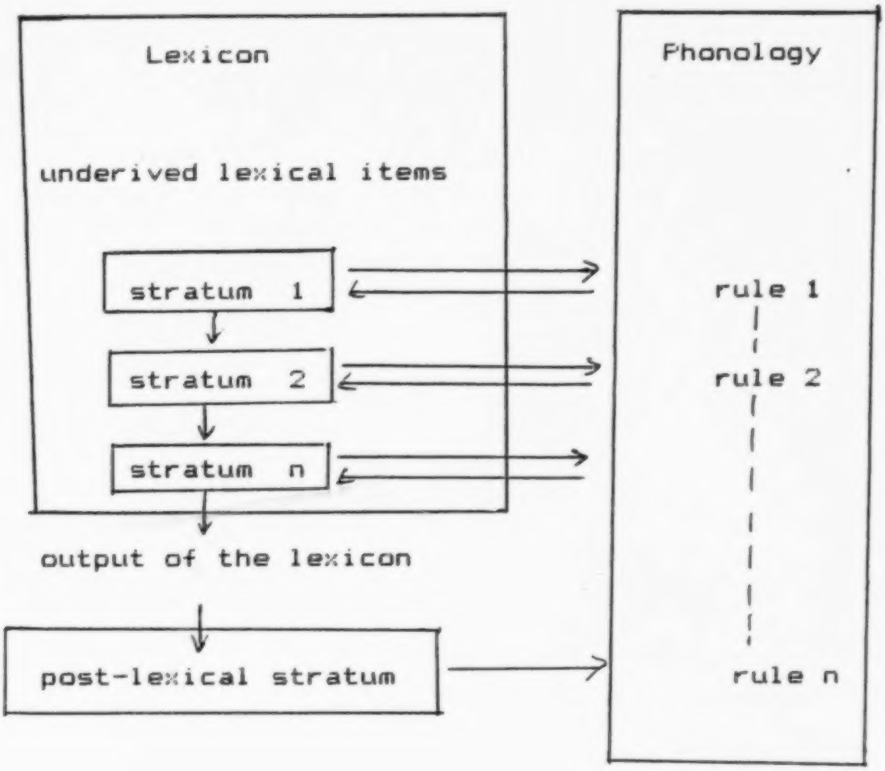
(11) # N ## N #

A way out of the above problem is to assume a different boundary symbol for each of the structures in (2-5). Such a solution will be ad hoc, since there will be no limit to the number of symbols that can be set up[1]. In this analysis, I will be assuming a theory of phonology that does not incorporate the use of boundary symbols.

Theoretical Background

In order to account for the problem mentioned above, I will adopt the theoretical framework of Lexical Phonology proposed in Kiparsky (1982 and 1983a and b), Mohanan (1982 and 1986), Pulleyblank (1983 and 1986), and Halle and Mohanan (1985). The model of the theory as presented in Pulleyblank (1983) and Archangeli (1984) is as follows:

(12) The Model of Lexical Phonology


Lexicon
underived lexical items
stratum 1
stratum 2
stratum n
output of the lexicon
post-lexical stratum
Phonology
rule 1
rule 2
rule n

The assumptions of this theory relevant to the analysis here are as follows:

a. Lexical and Post-Lexical Application of Rules.

Central to the theory of Lexical Phonology is the recognition of two types of rule applications, rather than two types of rules. Applications of rules are distinguished in regard to the domain of their operation. A rule may apply in the lexical domain (i.e., in the lexicon), in the post-lexical domain (i.e., in the syntactic component), or in both. The application of a phonological rule in the lexical domain or module is referred to as lexical rule application, while the application in the post-lexical domain is referred to as post-lexical rule application. Notice, however, that there is no distinction between lexical rules and post-lexical rules, since the same rule may apply in both domains.

For example, the palatalization rule which applies in the derivation of facial [fešal] from face [fes] is said to be applying lexically while the same rule functions post-lexically in the derivation of [æžyu] from *as you*.

As pointed out in Pulleyblank (1983), this division is a result of the different properties manifested by these two distinct types of rule applications. In other words, there is a *single* set of phonological rules, but any of these rules may be lexical, post-lexical or both. If a single rule applies both lexically and post-lexically, however, it will manifest different properties in the two applications.

For example, Mohanan (1982) shows that no rule which applies lexically is blocked by an intervening pause. On the other hand, the same rule which applies post-lexically can be blocked by the presence of a pause. The rule of palatalization in English is used below to illustrate the different properties manifested by a rule which applies both lexically and post-lexically.

(13) Application of the rule of palatalization before the assignment of a pause

i. racial /rēy + yæl/ --> [rēyšal] (Lexical application)

ii. miss you /mɪs + yu/ --> [mɪšya] (Post-lexical application)

(14) Application of the rule of palatalization after the assignment of a pause

i. racial [rēy .... šal] *[rēys....al]

ii. miss you [mɪs .... ya] *[mɪš....ya]

The examples in (13) show that the rule of palatalization in English applies both lexically and post-lexically. Nevertheless, example (14ii) illustrates that the rule is blocked by an intervening pause when it applies post-lexically, while such blocking is impossible in (14i) where the rule applies lexically. What is important, however, is rule applications as opposed to rules themselves.

b. The Stratum Ordering

During the early stage of generative grammar, the lexicon was seen as an unstructured collection of whatever was idiosyncratic and unpredictable. Thus, little or no attention was paid to the nature of the lexicon.

Whatever was regular and deserved linguists' attention was relegated to the non-lexical components of syntax and phonology.

However, Lexical Phonology, following Siegel (1974) and Allen (1978), adopts the notion that the lexicon consists of ordered strata (or levels). Expanding Siegel and Allen's claim that a stratum consists of a set of affixes, Mohanan and Mohanan (1984:576) propose that "the lexicon contains a set of morphological rules of affixation or compounding and that these rules are specified for their domain of application in terms of lexical strata." In other words, contrary to Siegel (1974), affixes, e.g., class 1 and 2, are not listed in stratum 1 and stratum 2 respectively. Rather, all morphemes, including affixes, are listed at one place in the grammar (the morpheme list). For any morpheme to exit the lexicon, it has to pass through all the lexical strata. The morphological rules that attach affixes to stems will be specified for their domain of application in terms of lexical strata. For example:

(15) in- (prefix), domain: stratum 1

un- (prefix), domain: stratum 2

It is also assumed that the domains of phonological rules are characterized in terms of these strata. For example:

(16) Trisyllabic shortening, domain: stratum 1

Word stress rule, domain: stratum 1

Hence the output of a word-formation stratum is mapped onto the phonological rules assigned to the relevant stratum in the lexicon.

In what follows, I will demonstrate how the above principles help solve the problem of N+N structures in Yoruba.

The analysis

To begin with, I assume that there are two different types of nouns derived from N+N structures in Yoruba: Compound nouns and Phrasal nouns. The compound nouns are derived in the lexical strata (i.e., the lexicon), while the phrasal nouns are derived in the post-lexical stratum (i.e., the syntactic component). The phonological rules which apply in the derivation of the compound nouns are applied in the lexicon. Such application is termed "lexical application". On the other hand, the rules which apply in the derivation of the phrasal nouns are applied in the post-lexical domain. This type of application is referred to as "post-lexical application".

By the above, I am implying that the derivations in (1-3) take place in the syntactic component, since the outputs are phrasal nouns. On the other hand, the derivations in (4-5) take place in the lexicon, since the outputs are compound nouns.

Motivations for Separating Phrasal Nouns from Compound Nouns

Similar to the analysis of Yoruba phrasal and compound verbs in Chapter 4 of Fọlarin (1987), there are also semantic and syntactic motivations for separating the domains of derivation of Yoruba compound nouns from those of phrasal nouns. However, contrary to the case of phrasal and compound verbs, there are also phonological reasons for separating the domains of derivation of these two different types of noun. In the following subsections, I will discuss each of these motivations.

Semantic Motivations

I assume that compound nouns should be listed as a subset of the words in the lexicon, since the meanings of compound nouns are not derived on the basis of the meaning of their constituents. On the other hand, phrasal nouns should be derived in the syntactic component. These do not need to be listed in the lexicon since their meanings are predictable and regular.

Compare, for example, the meanings of the compound nouns in (17) with those of the phrasal nouns in (18) below.

(17) Compound nouns

ọgbẹni	<--	ògbó	+	ẹni
'Mr.'		'elder'		'person'
omidan	<--	ọmọ	+	idan
'Miss'		'child'		'virgin'
ìletò	<--	ìlú	+	ètò
'village'		'town'		'arrangement'

(18) Phrasal nouns

aróoko	<--	ará	+	oko
'someone from the farm'		'someone'		'farm'
ọmoobìrin	<--	ọmọ	+	obìrin
'woman's child'		'child'		'woman'
ilẹ́ẹ̀bùn	<--	ilé	+	Ẹbùn
'Ebun's house'		'house'		'name of a person'

The compound nouns in (17) can be said to be "semantically lexicalized" or frozen (cf. Bauer 1983:55). In other words, they lack "semantic compositionality" (see Aronoff 1976). Bauer (1983), in his description of English compounds, identifies such componds as "exocentric" or bahuvrihi compound, using Sanskrit terminology. Exocentric compounds are said to be hyponyms of some unexpressed semantic head, and they are usually seen as metaphorical or synecdochic.

Similar examples in English are "redskin" and "highbrow". Notice that "redskin" is not a type of skin, nor is "highbrow" a type of brow.

In contrast to the lexicalized meanings in (17), the meanings of the phrasal nouns in (18) can be derived on the basis of the meanings of their components. Therefore, semantically, the compound nouns should be separated from phrasal nouns.

Syntactic Motivation

A very close observation of the data in (1-3) reveals that the second noun in the N+N constructions regularly functions as the modifier of the first noun. One example from each of the sets in (1-3) is repeated below.

(19)	a.	ilé	+	tẹ́tẹ́	-->	iléetẹ́tẹ́
		'house'		'gambling'		'house of gambling'
	b.	ará	+	oko	-->	aróoko
		'someone'		'farm'		'someone from the farm'
	c.	agbo	+	ilé	-->	agboolé
		'yard'		'house'		'house yard'

In all the examples in (19a-c), the second noun always modifies the first noun. On the other hand, it is not always easy to decide which noun modifies the other in the formation of compound nouns. Some examples from (4) and (5) are also repeated below for illustration.

(20) a. ògbó + ẹni --> ọ̀gbẹ́ni
‘elder’ ‘person’ ‘Mr.’

b. ọmọ + idan --> omidan
‘child’ ‘virgin’ ‘Miss’

c. ojú + òde --> ojúde
‘eyes/face’ ‘outside’ ‘open space’

d. ọmọ + obìrin --> ọmọbìrin
‘child’ ‘woman’ ‘girl’

In (20c) one can assume that the first noun functions as a modifier of the second noun. In (20d), both nouns (i.e., ọmọ + obìrin) can be said to be separate heads, since the word "girl" is derived from the combination of "child" and "woman". However, in (20a-b), it is not easy to determine which noun modifies the other.

If the underlying structures of both phrasal and compound nouns function differently syntactically, one should assume that the domains of derivation of both phrasal and compound nouns must be different.

Another syntactic motivation for separating the domain of derivation of compound and phrasal nouns is in regard to the relative clause marker "ti" in Yoruba. For instance, the two nouns in phrasal constructions can be interrupted by a relative clause marker "ti" while such interruption is not allowed with compound nouns. This observation is illustrated below.

(21) Phrasal nouns

I II

a. ilé + Dàda --> ilée ti Dàda
‘house’ ‘name of a person’ ‘house of Dada’

b. ará + oko --> aráa ti oko
‘someone’ ‘farm’ ‘someone of the farm’

c. ọmọ + obìrin --> ọmọọ ti obìrin
‘child’ ‘woman’ ‘child of the woman’

(22) Compound nouns

I II

a. ògbó + ẹni --> ọ̀gbẹ́ni *ògbó ti ẹni
'elder' 'someone' 'Mr.'

b. ọmọ + idan --> omidan *ọmọ ti idan
'child' 'virgin' 'Miss'

c. ojú + òde --> ojúde *ojú ti òde
'eyes' 'outside' 'open space'

The illustrations in (21) and (22) above show that the N+N structures that derive phrasal nouns can be interrupted with a relative clause marker, while those of the compound nouns cannot be interrupted. This shows that compound nouns function as single words, while phrasal nouns can function as two separate nouns.

Another point to support the above observation is that, whenever a compound noun takes a modifier, the modifier modifies the whole noun as a single lexical item. On the other hand, a modifier can modify the second noun in a phrasal noun without modifying the first noun in the phrase. For example,

(23) I II III

a. ilé + Dàda --> iléeDàda --> iléeDàda kúkúrú
'house' 'Dada's house' 'short'
"house of Dada
who is short"

b. ará + oko --> aróoko --> aróoko ẹgàn
'someone' 'farm' 'someone from
the farm' 'bushy'
"someone from a
bushy farm"

c. ọmọ + obìrin --> ọmoobìrin --> ọmoobìrin gíga
'child' 'woman' 'woman's child' 'tall'
"the child of
the tall woman"

(24) I II III

a. ọmọ + obirin --> ọmọbìrin --> ọmọbìrin gíga
'child' 'woman' 'girl' 'tall girl'

b. ọmọ + idan --> omidan --> omidan Fọlárin
'child' 'virgin' 'Miss" 'Miss Fọlárin'

c. ojú + òde --> ojúde --> ojúde ọba
'eyes' 'outside' 'open space' 'king's open space'

In (23), even after the application of phonological rules in column II, the modifiers (which occur after the phrasal nouns in column III) modify only the second noun in the phrase (i.e., the second noun in column I). However, in (24), the modifier placed after a compound noun in column III modifies the noun as a single word.

The examples in (21-24) above show that, syntactically, phrasal nouns function as two separate words, while compound nouns function as single nouns. On the basis of these syntactic differences between phrasal and compound nouns, one is justified in separating their domains of derivation.

Phonological Motivation

As mentioned above, each of the five groups of N+N constructions in (1-5) undergoes a different phonological rule. Those in (1) undergo a vowel insertion rule while those in (2) and (3) undergo a regressive assimilation rule and an /i/ assimilation rule, respectively. Similarly, the structures in (4) undergo a V_2 deletion rule while those in (5) undergo a V_1 deletion rule.

Recall that the application of the vowel insertion, regressive assimilation, and /i/ assimilation rules to the constructions on the left side of the arrow in (1-3) results in phrasal nouns, while the application of the vowel deletion rules generates compound nouns. Since phrasal nouns are derived in the syntactic component (after all syntactic rules have applied), the phonological rules applicable in their derivation should be specified to apply post-lexically. Similarly, the vowel deletion rules applicable in the derivation of compound nouns should also be specified for application in the lexical strata, since compound nouns are derived in the lexicon.

Such specifications are shown as follows in Table 1.

Rules	Stratum 1	Stratum 2	Post-lexical stratum
Vowel Insertion			X (6)
Regressive Assimilation			X (7)
/i/ Assimilation			X (8)
V_2 Deletion	X (9)		
V_1 Deletion		X (10)	

Table 1: A table showing the five phonological rules discussed above and their specified domain of application. X marks the stratum in which the rule applies, while the parentheses refer to the number of the rule in the text.

If each rule is specified for its domain of application, the vowel deletion rules will be blocked from applying to phrasal structures, while the assimilation rules will also be blocked in the derivation of compound nouns.

Any theory that does not separate lexical application of rules from post-lexical application will have to devise an ad hoc means of blocking rules (7) and (8) from applying to the constructions in (4) and (5). Recall that all the structures in (2-5) have identical enviroments.

If all phonological rules are only applied in the syntactic component, after all morphological and syntactic rules have applied, it will be difficult, for instance, to block a rule such as V_2 deletion (i.e., rule (9)) from applying wrongly to the constructions in (2), (3), and (5).

Lexical Phonology offers a principled way of blocking vowel assimilation rules (7) and (8) from applying in the derivation of compound nouns by assuming that rules should be allowed to apply lexically and post-lexically. In this way, compound nouns which have undergone lexical rules will no longer meet the structural descriptions of the vowel assimilation rules, which are post-lexically applied.

Having separated the domains of derivation of phrasal nouns (i.e., 1-3) from compound nouns (i.e., 4-5), one other question is how to block the V_1 deletion rule from applying to the constructions in (4), and V_2 deletion rule from applying in (5).

The adoption of the stratum theory of morphology by Lexical Phonology offers a way to account for this problem. The compound nouns are divided into two types: Type 1 compound nouns and Type 2 compound nouns. Type 1 compound nouns, which undergo the V_2 deletion rule, are derived in stratum 1. On the other hand, Type 2 compound nouns, which undergo the V_1 deletion rule, are derived in stratum 2. Recall that each rule is specified for its domain of application.

Therefore, the V_1 deletion rule, whose domain of application is stratum 2, cannot apply to forms in stratum 1. Similarly, the V_2 deletion rule, whose domain of application is stratum 1, cannot apply in stratum 2. In this way, both V_1 and V_2 deletion rules are blocked from applying to the wrong structures.

Any analysis that does not recognize the lexicon as consisting of a set of ordered strata will also have problems in accounting for these two types of compound nouns in Yoruba.

Aside from all the rules discussed above, there is also the vowel harmony rule which applies in the derivation of compound nouns, but fails to apply in the derivation of phrasal nouns even when its structural description is met. The vowel harmony rule is repeated below and a sample derivation of ọ̀gbẹ́ni "Mr." (a compound noun), and ẹ̀bóodò "near the river" (a phrasal noun), illustrates the above observation.

(25) Vowel harmony Domain: Strata 1 and 2

$$V \;\text{-->}\; [-ATR] \;/\; [\text{---}\; C \; \underset{[-ATR]}{V}$$

(26) Derivation of ọ̀gbẹ́ni "Mr.":

[ògbó] [ẹni]	Stems
[ògbó][ẹni]	Compounding
[ògb ́ẹni]	V_1 deletion
[ògbẹ́ni]	Tone relinking
[ọ̀gbẹ́ni]	Vowel harmony
ọ̀gbẹ́ni	Output

(27) Derivation of ẹ̀bóodò "near the river":

[ẹ̀bá] [odò]	Stems
[ẹ̀bá][odò]	Phrasal concatenation
[ẹ̀bóodò]	Regressive assimilation
*[èbóodò]	Vowel harmony
ẹ̀bóodò	Output

The derivation in (26) illustrates the applicability of the vowel harmony rule in the derivation of a compound noun. On the other hand, (27) illustrates the fact that the rule does not apply in the derivation of the phrasal noun despite the fact that its structural description was met. Therefore, in order to block the vowel harmony rule from applying to phrasal outputs, its domain of application must be specified as being lexical. If rules are not allowed to apply either lexically or post-lexically, the facts of phrasal nouns as opposed to compound nouns will be difficult to account for in Yoruba.

Similarity Between Phrasal and Compound Nouns

In spite of the semantic, syntactic, and phonological differences between phrasal nouns and compound nouns in Yoruba, it is, however, observed that both nouns can undergo an identical morphological process.

As shown in examples (28) and (29) below, both compound and phrasal nouns undergo the prefixation of oni-.

(28) Prefixation of oni- to phrasal nouns

a. ilé `house'	+	tẹtẹ́ `gambling'	-->	iléetẹtẹ́ `house of gambling'	-->	oníléetẹtẹ́ `owner of the gambling house'
b. agbo `yard'	+	ilé `house'	-->	agboolé `house yard'	-->	alágboolé[2] `owner of the house yard'

(29) Prefixation of oni- to compound nouns

a. ẹran `meat'	+	oko `farm'	-->	ẹranko `animal'	-->	ẹlẹ́ranko `owner of the animal'

b. ojú	+	òde	-->	ojúde	-->	olójúde
'eyes'		'outside'		'open space'		'owner of the open space'

It is a common phenomenon in Yoruba for phrasal units to undergo morphological processes. This, however, does not preclude the separation of the derivation of phrases from the derivation of single words, based on the criteria discussed in above.

Alternative Analyses of N+N Constructions

Introduction

Many scholars of Yoruba (e.g., Ward 1952, Rowlands 1954, Siertsema 1959. Awobuluyi 1964, Courtenay 1968, Oyelaran 1971, and Awoyale 1985) have attempted to account for the N+N constructions in Yoruba. Since Oyelaran and Awoyale's analyses have come closest to identifying the similarities and the differences in some of these constructions, I will briefly present their analyses below, and show why they are inadequate in accounting for all the facts of N+N structures in Yoruba.

Oyelaran's (1971) Analysis of N+N Constructions

Working within the framework of Transformational Generative Grammar (henceforth TGG), Oyelaran (1971) postulates the following underlying formal notation for an NP that is a N+N construction, in which DM stands for Determiner Marker.

(30) $$\left[_{NP}\ {}_{N}[X]_{N} \quad DM \quad {}_{N}[Y]_{N}\ \right]_{NP}$$

In other words, all the N+N constructions in (1-3) would have the underlying notation in (30). He further sets up the following deletion rule which "optionally deletes the DM before nouns with vowel initials" Oyelaran (1971:123).

(31) Determiner Marker Deletion (optional)

$$DM \rightarrow \emptyset \ / \qquad [\ [+syl]$$

If the DM is not deleted, its surface specification will be as shown in (32) below:

$$(32)\quad \text{DM} \dashrightarrow \begin{bmatrix} +\text{syl} \\ \alpha_1 F_1 \\ \vdots \\ \alpha_n F_n \\ -\text{H} \\ -\text{L} \end{bmatrix} \Big/ \begin{bmatrix} +\text{syl} \\ \alpha_1 F_1 \\ \\ \alpha_n F_n \\ +\text{T}_1 \\ \\ \end{bmatrix}_N \text{---} \begin{bmatrix} \\ \\ \\ \\ \end{bmatrix}_N$$

Rule (32) states that DM assumes the f-features of the vowel final of the preceding noun.

The application of Oyelaran's rules to the phrasal nouns in (1a), (2b), and (3a) is illustrated in (33a, b, and c), respectively.

(33)	I		II	III
	Underlying forms		Rule 31	Rule 32
a.	/ilé + DM + tẹ́tẹ́/	-->	---	[iléetẹ́tẹ́]
b.	/ẹ̀bá + DM + odò/	-->	[ẹ̀bá odò]	---
c.	/ìwé + DM + ilé/	-->	[ìwé ilé]	---

Notice that the outputs in column II (i.e., after the application of 31) differ from the correct outputs which are [ẹ̀bóodò] and [ìwéelé].

Oyelaran himself observed this discrepancy and proposed the application of a nontonal feature assimilation rule to the outputs of rule (31) (i.e., the forms in column II above). This assimilation rule is represented below in (34).

(34) Non Tonal Feature Assimilation

$$[+\text{syl}]_2 \longrightarrow \begin{bmatrix}\alpha_1 F_1\\ \vdots\\ \alpha_n F_n\end{bmatrix} \;/\; X_N \begin{bmatrix}+\text{syl}\\ \alpha_1 F_1\\ \vdots\\ \alpha_n F_n\end{bmatrix}_1 --- \;[-\text{syl}]$$

Condition: 1 is of a lower vowel height than 2. X
may be empty.

The rule in (34) states that a higher vowel becomes assimilated to a preceding lower vowel. From the specification of rule (34), it is obvious that it only applies to the output of rule (31) in (33c) to derive [ìwéelé], which is the correct output. Rule (34) fails, however, to account for the derivation of [ẹbóodò] from [ẹbá odò]. In other words, Oyelaran's rules in (31), (32), and (34) only account for the phrasal nouns in (1) and (3). The data in (2) are not accounted for.

As regards the compound nouns, no reference was made to the data in (5) which undergo a V_1 deletion rule. However, Oyelaran postulated an adjective derivation rule to account for the compound nouns in (4). The rule is represented below in (35).

(35) Adjective Derivation

$$[+\text{syl}] \longrightarrow \emptyset \;/\; \text{Adj}^{[}\ \text{N}^{[}\,---$$

Oyelaran's application of rule (35) is illustrated in (36).

(36)	Stems				Rule 32
a.	ọmọ 'child'	+	obìrin 'woman'	-->	ọmọ bìrin 'girl'
b.	ojú 'eyes'	+	òde 'outside'	-->	ojú de 'open space'
c.	ìdí 'bottom'	+	ọkọ̀ 'vehicle'	-->	ìdí kọ̀ 'motor park'
d.	orí 'head'	+	oko 'farm'	-->	orí ko 'hamlet'

Notice that in (36), the outputs of rule (35) in column II are written as two separate words. One wonders why this is so, since the forms in column II function as single lexical items after the application of the vowel deletion rule (cf. Awoyale 1985 and Akinlabi and Oyebade 1986).

In addition, Oyelaran (1971:141) assumes that the second elements in column II of (36) are "derived adjectives". This assumption does not seem plausible for a number of reasons:

a. All adjectives in Yoruba can occur as individual lexical items that have independent meanings. For example,

(37)			
	a.	yii	'this'
	b.	pupa	'red'
	c.	rere	'good'
	d.	mYran	'another'
	e.	giga	'tall'
	f.	keji	'second'

On the other hand, notice that the second items in column II of (36) have no meaning independent of the first item. They do not even exist as individual words in Yoruba. If those items are adjectives, as Oyelaran assumed, one would expect them to behave similar to other adjectives in the language.

b. In Yoruba, adjectives always modify the nouns they follow. For examples,

(38) iwé pupa "red book"
'book' 'red'

ọmọ rere "good child"
'child' 'good'

ilé giga "tall building"
'house' 'tall'

ọmọ keji "second child"
'child' 'second'

In (38), the second item always modifies the first items. On the other hand, since the second items in column II of (36) no longer represent independent lexical items, it is difficult to claim that they modify the first noun. All the forms in column II of (36) are represented as follows:

(39) a. ọmọbirin 'girl'

b. ojúde 'open space'

c. idíkọ̀ 'motor park'

d. oríko 'hamlet'

If each of the items in (39) represents a single lexical item whose meaning has become lexicalized, as argued above, it then becomes difficult to decide which part of the word modifies the other. Notice that this argument does not necessarily apply to all languages. For example, in English, "red skin" has a lexicalized or metaphorical meaning. Nevertheless, one can still claim that "red" is an adjective which modifies "skin" syntactically. On the other hand, this claim will be rather difficult to make if, for example, in "red skin", the word "red" undergoes a hypothetical final /d/ deletion rule and the word becomes "reskin". Since "re" no longer exists as an independent word, it will be difficult if not impossible to claim that it still modifies "skin".

In general, the problem with Oyelaran's analysis seems to lie within the theory he employed. Recall that in TGG, all phonological rules are applied after all morphological and syntactic processes have taken place. Even if such a theory has a way of explaining the N+N structures in (1-3), there will still be problems in accounting for the difference between the data in (4) and (2) and (3) on one hand, and (4) and (5) on the other.

Awoyale's (1985) Analysis of N+N Constructions

Despite the fact that Awoyale did not work within any particular framework, he still identifies the differences and the similarities between phrasal and compound nouns.

His general observation as regards the N+N constructions is that the relationship between the two nouns is that of a "head noun and a possessive qualifier" (Awoyale 1985:8).

Phonologically, however, his analysis is as follows:

a. For all the phrasal nouns in (2) and (3), he assumes a vowel assimilation rule as formalized below:

(40) Vowel Assimilation Rule

$$\begin{bmatrix}+\text{syll}\\ \alpha F\end{bmatrix} \longrightarrow \begin{bmatrix}+\text{syll}\\ \beta F\end{bmatrix} \;/\; \text{---}\,\Big]_{N} \;+\; \Big[_{PQ}\begin{matrix}+\text{syll}\\ \beta F\end{matrix}$$

In rule (40), the final vowel of a first noun assimilates to the initial vowel of the second noun in a N+N construction.

Observe that the rule in (40) is not applicable to the constructions in (3); therefore, he assumes that all the data in (3) are exceptions to the vowel assimilation rule in (37). These exceptions, however, were not accounted for.

As regards the compound nouns, Awoyale postulated the following contraction rule:

(41) Vowel Contraction Rule

$$\begin{bmatrix}+\text{syll}\\ \alpha F\end{bmatrix} \longrightarrow \emptyset \;/\; \begin{matrix}+\text{syll}\\ \alpha F\end{matrix}\,\Big]_{N} \;+\; \Big[_{PQ}\,\text{---}$$

In rule (41), the initial vowel of the second noun is deleted in a N+N construction.

Observe that both the assimilation rule and the contraction rule in (40) and (41) respectively have identical structural descriptions. This being the case, either of these rules is applicable to all the data in (2-5).

Recall that the data in (2) and (3) only undergo vowel assimilation rules, while those of (4) and (5) only undergo vowel deletion rules. Since there is no device in Awoyale's analysis to block either (40) or (41) from applying to the wrong structures, it is obvious that these rules cannot account for all the facts of N+N constructions in the language.

Summary

The paper has demonstrated how the theory of Lexical Phonology can be fruitfully employed to account for the facts of N+N structures in Yoruba. The two major assumptions of Lexical Phonology that help account for these facts are: (a) the adoption of the stratum theory of morphology, and (b) the idea of lexical and post-lexical application of rules.

The first assumption offers a way to account for the difference between Type 1 compounding and Type 2 compounding. The second assumption, on the other hand, helps to account not only for the syntactic and semantic differences, but also for the phonological differences in compound and phrasal nouns. This was achieved by separating the domains of derivation of compound nouns from that of phrasal nouns. The rules that are involved in the derivation of compound nouns are applied lexically (i.e., in the lexicon), while those that are involved in the derivation of phrasal nouns are applied post-lexically.

Previous analyses that do not take the above assumptions into consideration were found to be inadequate to account for the all the facts of N+N constructions in Yoruba.

NOTES

1. See Rotemberg (1978) and Mohanan (1982) for other problems associated with boundary symbols.

2. Some phonological rules have applied to some of the examples in (28) and (29) to change *oní*- into *al*-, *ol*-, *el*- etc.

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SOME KLAMATH-SAHAPTIAN GRAMMATICAL CORRESPONDENCES

Noel Rude

Abstract: Evidence for the genetic relationship between Klamath and Sahaptian is growing. The current list of potential Klamath-Sahaptian cognates contains core lexical material sufficient to demonstrate the validity of a genetic relationship, although many details of sound correspondence have yet to be worked out. But it is not only in core lexical material that Klamath and Sahaptian are related. The purpose of this paper is to show that these languages also share enough grammatical morphology to make a convincing case by itself.

Introduction: Aoki (1962) describes the relationship within Sahaptian (between Nez Perce and Sahaptin), while Aoki (1963) provides a list of potential cognates and proposes certain sound correspondences between Klamath and Sahaptian. DeLancey et al (1986) expand the list of Klamath-Sahaptian cognates as well as suggest others in Chinookan and Tsimshian. It should be noted that this paper neither assumes nor argues for any special subgrouping of Klamath-Sahaptian within a greater Penutian phylum.

Klamath maintains a three way manner distinction for stops (plain unaspirated, aspirated, and ejective), while in both Sahaptian languages there is only a two way distinction (plain stops and ejectives). At this time it is not clear whether the distinction between plain unaspirated and aspirated stops is a secondary development in Klamath or whether it was lost in Proto-Sahaptian. In the proposed Sahaptian-Klamath cognate sets, ejectives generally correspond to ejectives and nonejectives to nonejectives (with most exceptions being explainable as diminutive derivation by glottalization). Both Klamath and Sahaptian have glottalized resonants, but in Sahaptian they are generally derivable from /R + ?/. It is with regard to the various relationships between the vowels, the palatals, velars, and uvulars, and the status of the voiceless resonants in Klamath and the lateral affricates in Sahaptian that there is the least certainty.

Although this paper presents sufficient data to suggest a genetic relationship between Sahaptian and Klamath, it is of course possible that some similarities could be the result of the areal spread of certain grammatical morphology. It is when taken all together, and when considered along with the many cognates in fundamental vocabulary, that the evidence for a genetic relationship becomes overwhelming.[1]

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NP morphology:

Kinship terms: In Sahaptian there are two kinds of kinship terms which have been called "referential" and "nonreferential".[2] The nonreferential forms are only used in the vocative and with the possessive prefixes for 'my' and 'your'. Table 1 lists the Nez Perce forms for 'father' and 'mother', and Table 2 the equivalent forms for Umatilla Sahaptin. Most of the referential kinship terms are derived by prefixing *pi(i)- or *pe(e)-. According to Jacobs (1931:236), this kinship prefix is "clearly related to the independent third person pronoun. ... It seems a fossilized element which in most instances has no possessive signification, serving to symbolize forms that are not used for first or second person possessive."

	ABS	OBJ	ERG/GEN	VOC
'my father'	na?tóot	na?tóotap	na?tóotam	tóota?
'your father'	?im'tóot	?im'tóotap	?im'tóotam	
'(his) father'	pist	pisine	pisitpim	
'my mother'	ne?iic	ne?iicep	ne?iicem	?iice?
'your mother'	?im?iis	?im?iisep	?im?iisem	
'(his) mother'	pike	pikéene	pikéepim	

Table 1. Some Nez Perce kinship terms.

	ABS	OBJ	GEN	VOC
'my father'	natútas	natútaspa	natutasmi	túta
'your father'	tút	tútpa	tutmi	
'(his) father'	pšit	pšina	pšitmi	
'my mother'	na?iłas	na?iłaspa	na?iłasmi	?iła
'your mother'	?ił	?iłpa	?iłmi	
'(his) mother'	pčá	pčána	pčanmi	

Table 2. Some Umatilla Sahaptin kinship terms.

Not only do many Klamath kinship terms have Sahaptian cognates, Klamath even employs much the same morphology.[3] Just as in Sahaptian, nonvocative kinship terms prefix a bilabial stop; in the case of Klamath the unaspirated *b-*. And, as a comparison of the Klamath forms in Table 3 indicates, Klamath kinship terms inflect with a similar set of case marking suffixes. The Nez Perce ergative/genitive kinship term suffix *-em* and the Klamath genitive suffix *-am* appear to be cognate. In both Sahaptian and Klamath there is a special case marking suffix for kinship terms; *-ep* in Nez Perce, *-pa* in Sahaptin, and *-ap* in Klamath. In Sahaptian it marks the object, and in Klamath the subject. This skewing may reflect the difference between the 3-way case marking system of Sahaptian (in which both arguments in a transitive clause are case marked [ERG and OBJ] while the subject in an intransitive clause [ABS] is unmarked for case) and the purely nominative-accusative pattern in Klamath.

	NOM	OBJ	GEN	VOC
'father'	ptisap	ptisa	ptisam	tisiip
'fathers'	ptisiisap	ptisiisa	ptisiisam	
'mother'	pk'isap	pk'isa	pk'isam	k'isiip
'mothers'	pk'isiisap	pk'isiisa	pk'isiisam	

Table 3. Some Klamath kinship terms.

The Klamath system differs from Sahaptian in that there are no possessive prefixes, and also in the mode of plural marking. In Nez Perce kinship terms are made plural by the suffix *-me*, and in Klamath by the suffix *-i(i)s* (see Table 3).[4]

NP Case marking: In both Sahaptian and Klamath NPs are marked for case.

In Sahaptian the object NP suffix is *-*ne*, and in Klamath it is *-'as*. While there seems to be no equivalent of the Klamath *-'as* in Sahaptian, Sahaptian *-*ne* does have a cognate in Klamath. Demonstratives and articles in Klamath are marked for object by the suffix *-n*. Adjectives in Klamath case mark by a different set of suffixes; *-i* for nominative subject, and *-a* for object. While *-i* seems to have no cognate in Sahaptian, in Nez Perce nonderived adjectives suffix *-ene* (instead of *-ne*) for the object case. It thus appears that the case marking of adjectives with *-*e* predates the split between Klamath and Sahaptian. After the development of object marking with *-ne* in Sahaptian, Nez Perce continued to mark adjectives with both *-e* and *-ne*.

Genitives appear to be case marked by cognate suffixes, Nez Perce *-nim*, Sahaptin *-nmi*, and Klamath *-'am*.

The Sahaptin allative NP suffix *-kan/-can* reconstructs as *-*ke'n*. As Rigsby notes (*Sahaptin Grammar*, p. 44), the Sahaptin variants *-kan* and *-čan* point to an earlier vowel *e* which, when not made *a* by vowel harmony, would palatalize the *k*.

In Nez Perce the form of the ablative suffix is *-ix* (phonemically *-ik*), while in both Klamath and Sahaptin it takes the form *-i*. In Sahaptian the ablative suffix *-*i(k)* occurs in its simple form with the demonstratives, but with nouns it is composed of the allative *-*ke'n* plus *-*i(k)*, e.g. Nez Perce *-ki'nix*, and Sahaptin *-kni/-čni* where, once again, the alternate palatalized and non-palatalized forms reveal the earlier first vowel to have been *e*. In Klamath *-knii* means 'from, people or person from'. That the glottal stop was originally part of *-*ke'n* and not of *-i(x)* is made clear by the Nez Perce simple ablative (which suffixes to the demonstratives and the interrogative *mi-*) in which only *-i(x)* (and not *-*ke'n*) is suffixed, e.g. *kinix* 'from this', *koniix* 'from that', *minix* 'whence?'. Nez Perce *-laykin* and Sahaptin *-laykan*, both NP suffixes meaning 'near', perhaps also contain the allative element *-*ke'n*.[5]

The Sahaptian instrumental NP suffix is *-*ki(n)* (Nez Perce *-ki*, Sahaptin *-ki/-kil/-kin*). The Sahaptin *k* has not palatalized, perhaps because the earlier vowel was a schwa (schwa regularly became *i* in Nez Perce). This might explain the vowel in the cognate Klamath instrumental suffix *-tga* (the *t* is a locative in Klamath).

Derivational suffixes: The most common nominalizer in Klamath is *-s*. Nez Perce also nominalizes with *-s*, and Sahaptin with *-š*, but in Sahaptian the most productive nominalizer is *-t* (*-t* is a locative in Klamath).

In Klamath *-waas* derives place names (*waas* 'nest, den, burrow, home' is a nominalized *waa* 'pl. live, stay, exist'). The equivalent place name suffix in Nez Perce is *-niwees* (similarly formed from the Nez Perce copula *wee* and the nominalizer *-s*).

Pronominal morphology:[6]

Personal pronouns: Sahaptian and Klamath share the same basic pronominal formatives from which the respective systems of personal pronouns are built (the singular forms of these are listed in Table 4). The basic formants are _*ni_ for 1st person, _*mi_ for 2nd person, and _*bi_ for 3rd person.[7]

The pronominal element _?i_, a suppletive 2nd person pronoun in Klamath, is probably cognate with the alternate 2nd person pronoun _?ée_ in Nez Perce. Also in Nez Perce, _?i-_ is a kind of deictic element which is not only prefixed to the other pronouns, but to a very large number of other morphemes. In Klamath _mi_ is the formant for most of the oblique 2nd person pronouns, and by itself means 'your'.

	Nez Perce	Northeast Sahaptin	Warm Springs Sahaptin	Yakima Sahaptin	Klamath
1st	?iin	in	ini	ink	ni
2nd	?iim	im	imi	imk	mi 'your'
	?ée				?i
3rd	?ipi	pɨn	pɨn	pɨnk	bi

Table 4. Personal pronouns.

Pronouns in Klamath are pluralized by _-at_, a suffix identical in form to the Klamath plural imperative (which is also _-at_): _naat_ 'we', _?aat_ 'you pl.', _baat_ 'he/she/it'. The Nez Perce _?ée_ 'you' is also pluralized by the same suffix-- _-tx_ -- as marks plural imperatives: _?éetx_ 'you all'.

The Klamath emphatic pronouns with _oo_, e.g. _noo_ 'I myself', would seem to derive from a suffixation of _waa_, defined in Barker KD as 'pl. live, stay, exist' (the sequence _i_ + _waa_ regularly becomes _oo_ in Klamath).[8]

The Klamath suppletive _gew_ 'my' probably derives from the proximate marker _g_, cf. the proximate demonstrative 'this' (Klamath _gee_, Nez perce _kii_, Sahaptin _či_,[9], and the Nez Perce 1st person clitic _-x_ < _-*k_). It is possible that the _-ew_ element of Klamath _gew_ is related to the Sahaptin allative NP suffix _-yaw_.

Demonstratives: Nez Perce has a simple two way demonstrative system; _kii_ 'this' and _yox_ 'that', with oblique forms _kin-_ 'this' and _kon-_ 'that'. There is a three way system in Sahaptin; _či_ 'this', _k'wáy_ (oblique forms mostly built on _kun-_) 'that', and _yuk_ (a cognate of the Nez Perce suppletive _yox_) 'that over yonder'. Klamath also has a three way system; _gee_ 'this' (a likely cognate of Sahaptian _*kii_ 'this'), *hoot* 'that' visible, and *nee* 'that' invisible. The Sahaptian proximate **kin-* and distal **kon-* have clear Klamath cognates in *ginaa* 'this way' and *gonii* 'that way' (cf. the Nez Perce locative *kine* 'in this, here' and ablative *koniix* 'from that'). The Klamath visible *hoot* 'that' is possibly cognate with the Sahaptian 3rd person verbal prefix **hi-*.

	Klamath	Nez Perce	Sahaptin
Proximate	gee	kii, kin-	či
Distal	hoot	yox̣, kon-	k'wáy, kun-
Invisible, or More distant	nee		yuk

Table 5. The demonstratives.

The Klamath demonstratives have special plural forms which are found only in the oblique cases. These are formed by suffixing the pluralizer *-y* plus the objective *-'as*: *geey'as* 'these', *honky'as* 'those' (visible), and *neey'as* 'those' (invisible). This pluralizing suffix *-y* is probably related to the Klamath kinship pluralizer *-i(i)s*, and also to the Nez Perce plural nominative verbal suffix *-i(i)*.

Interrogative and relative pronouns: The nonhuman interrogative/indefinite pronoun ('what? something') is cognate in all three languages; *?itúu* in Nez Perce, *tún* in Umatilla Sahaptin, and *dwaa* in Klamath. The human interrogative ('who? someone') is *?isii* in Nez Perce and *šin* in Umatilla Sahaptin.[10]

For the human interrogative pronoun, Klamath has *kani* 'who? someone'. It is built from the Klamath relative particle *ka*, which is obviously cognate with the Nez Perce relative particle *ke*.

The Nez Perce relative particle *ke* stands at the beginning of relative clauses and suffixes pronominal clitics in agreement with 1st and 2nd person subjects and objects within the relative clause. In Klamath *ka* also functions as a nonhuman interrogative pronoun 'which?' (cf. *kani* 'who?'), and also forms the basis of the relative pronoun which in Klamath inflects only for case; *kat* subject and *kant* object.

Third person referent tracking: The 3rd person personal pronouns in Sahaptian and Klamath are all emphatic. Nonemphatic pronominal reference in both languages is accomplished by pronominal clitics.

In Sahaptin nonemphatic 1st/2nd person pronominal reference is obligatorily marked in all finite clauses by a system of 2nd place (Wackernagel's position) clitics. In Nez Perce a cognate system of pronominal clitics attach only to certain particles and adverbials. In both Sahaptian languages 3rd person pronominal reference is marked by three verbal prefixes. In Nez Perce these are:

1) hi- a. 3rd person subject of an intransitive verb.

b. 3rd person subject of a transitive verb when its object is 1st or 2nd person.

2) ?e(w)- a. 3rd person object of a transitive verb when its subject is 1st or 2nd person.

b. 3rd person genitive selected as subject of an intransitive verb.

3) pée- 3rd person subject of a transitive verb and its 3rd person singular object.[11]

Rigsby (forthcoming) describes much the same functions for the equivalent verbal prefixes (i-, á(w)-, and pá-) in Umatilla Sahaptin. Jacobs (1931), however, makes somewhat different observations for Northwest (Klikitat) Sahaptin. Virginia Hymes and Carol Genetti (both personal communication) note similar differences at Warm Springs. Ames (1986) provides a preliminary description based on the Jacobs collection of Klikitat texts. Perhaps it will be possible to characterize a single original function for each of these prefixes in Sahaptian, and thus also explain the seemingly unrelated syntactic distribution of Nez Perce ?e(w)-.

In Klamath the verb has no person markers. Instead, 3rd person arguments are referenced by a system of 2nd place clitics which are equivalent in form to the definate articles; the nominative hok and objective honk. The formant ho- is related to the Klamath visible demonstrative (the nominative hoot 'that' and objective hon 'that') and is likely also cognate with the Sahaptian 3rd person verbal prefix *hi-.[12]

Verbal morphology:

Stem types: In both Sahaptian languages verb stems divide into two morphological classes. In Nez Perce these are referred to as "conjugations I and II" in Swadesh (1930), and "s-class" and "c-class" in Aoki (1970).

Stems belonging to Swadesh's conjugation I (or Aoki's c-class) have a final n which surfaces only when stem final and with certain suffixes. The morphological distinction has broken down in most of the Sahaptin dialects. Sahaptin verb stems corresponding to the Nez Perce conjugation I (or c-class) Virginia Hymes (personal communication) calls "n-stems". The n is being reanalyzed, however, as a component of certain suffixes rather than as part of the verb stem. And thus Jacobs (1931:104) lists an "n-" and refers to it as a "grammatically inorganic glide ... appearing initially in a morphologic element". In Nez Perce this /n/ has four allomorphs, [Ø], [n], [ni], and [in], as in the following examples with the verb for 'speak'.[13]

4) c'iix̣-c-e
speak-IMPF-SG.NOM
'I am speaking'

5) c'iix̣n-e
speak-PST
'I spoke'

6) c'iix̣ni-qan-a
speak-HAB-PST
'I used to speak'

7) c'iiqin
speak
'Speak!' or 'I have spoken' or 'a speech'

The corresponding forms for the other morphological stem class are as follows. Note that here the absence of a suffix marks only the imperative. Separate morphemes code the perfect and nominalizations.

8) tée'mik-s-e
go down-IMPF-SG.NOM
'I am going down'

9) tée'mik-e
go down-PST
'I went down'

10) táa'mix-qan-a
go down-HAB-PST
'I used to go down'

11) tée'mix
go down
'Go down!'

12) tée'mik-s
go down-IMPF
'I have gone down'

13) tée'mik-t
go down-N
'to go down, going down, a descent'

According to Swadesh (1931), "One might theorize that conjugation I consists of stems ending in n which added to c (i.e. [š]) becomes ts, i.e. páin + -ca > páitsa (i.e. páayca 'I am arriving')." This [n] + [s] --> [ts] is not a synchronic rule of Nez Perce phonology. It should also be noted that there are verbs with a surface stem final n before the imperfective suffix, e.g.

14) táwx̣an-c-a
    snore-IMPF-SG.NOM
    'I am snoring'

That Swadesh's analysis is historically accurate, however, is borne out by a comparison with Klamath. In Klamath also about half of all verb stems end in n, a segment which deletes in certain phonological environments. Klamath cognates of Sahaptian n-stems typically also end in n:

15) NP wii(n) 'cry, weep'
    Kl win 'interpret a shaman's song'
       swin 'sing'

16) NP wicx̣- adv. 'defecate'
    Sah ƛ'x̣(n) 'defecate'
    Kl sq'en 'defecate'

17) Sah wisx̣(n) 'sew'
    Kl sqen 'sew'

18) NP -te(n) 'go in order to ...'
    Kl otn (allomorphs include -tan) 'on, against, attached to' (marks the semantic role of an object NP)

19) NP hi(n) 'say, tell' (cf. him- adv. 'with the mouth')
    Kl han- 'with the mouth' (cf. hem talk, speak)

20) NP -tiwe(n) associative object
    Sah twana 'follow, accompany'
    Kl dola 'with'[14]

The cognate set for for 'eat' -- Klamath p'an (an n-stem) and Sahaptian *hipi (an i-stem) -- has members which are of opposite stem type.

The element n most likely has a morphological origin. I have made lists of n-stems for both Klamath and Sahaptian, and in each case a sizable percentage of n-stems are verbs of motion. This leads one to suspect that this verb stem marker -n may derive from the same source as the Klamath-Sahaptian verbal translocative -n(a) and perhaps even the objective suffix -*n.

There is another Klamath-Sahaptian verb final element besides n. There are, for example, a large percentage of Nez Perce verbs which are not n-stems but which end in i (perhaps most often a stressed *i*), e.g. *?ini* 'give', *hani* 'make', *neki* 'think' (cf. *nek-* 'carry'), *talqi* 'stop' (cf. the nominal *talláx* 'stop'), etc.). Also in Klamath, a large proportion of verbs which do not end in *n* end in *i'*, e.g. *cayi'* 'split', *dyeemi'* 'be hungry', *m'aasi'* 'be sick, taste', *yaami'* 'admire', etc. Although cognate forms are not readily apparent, it is a fact that a majority of verbs in both Nez Perce and Klamath end in either *n* or *i(')*.

Directionals: In both Klamath and Sahaptian verbs can inflect with cislocative ('hither') and translocative ('thither') directional suffixes (see Table 6). The one element obviously shared by both Klamath and Sahaptian is the translocative formative *-*n*, which Jacobs (1931:198) gives as "-na, motion or direction away; indeed. A very old directive ..."

	Klamath	Northwest Sahaptin	Northeast Sahaptin and Nez Perce
Cislocative	-ebg	-*m*	-*(i)m*
Translocative	-e*n*	-*n*a	-kik

Table 6. Sahaptian-Klamath directionals.

Object selection: Both Sahaptian and Klamath have strategies for the selection of certain non-patient case roles for object. In each language the "new" (or "promoted") object noun is case marked as an object and its semantic case role is marked by a verbal suffix (see Rude 1986a, b, and c). In example 21 from Nez Perce the verbal suffix *-?ey* marks the object (*?áayatona* 'woman') as a benefactive object.

21) pée-?wi-*?ey*-s-e ?imes ?áayato-*na*
3.3-shoot-BEN-IMPV-SG.NOM deer woman-OBJ
'He shot a/the deer for the woman'

There are two benefactive verbal suffixes in Nez Perce, *-?ey* and *-?eni*. Their occurrences are conditioned by the nature of the following aspectual suffix: *-?ey* occurs before the imperfective suffixes, *-?eni* before the past and future, etc. Cognates of one or the other of these occur variously in the Sahaptin dialects.

The verbal suffix *-?eni* (Sahaptin *-ni*) is identical in form to the verb for 'give': NP *?eni*, Sah *ni*.

The verbal suffix -?ey (Sah -(a)y) is not otherwise identifiable within Sahaptian. But it does have a cognate in Klamath. In Klamath the verbal suffix which marks a benefactive object is -ii, as is illustrated in example 22.

22) coy ?itbambl-ii-ya mna tGeewn'-a
and bring them back-BEN-IND his older sister-OBJ
'And [he] brought them back for his older sister'

In Klamath the verb for 'give' is oy. And in Klamath the phonological sequence oy regularly becomes ii when not in syllable initial position. A large percentage of Klamath verb stems and suffixes begin with either e or o, which leads one to the suspicion that these derive from old verbal prefixes.

Locative or goal objects are marked in Klamath by the verbal suffix -otn (the allomorph -tan in the following):

23) coy hok w'ak'a hot-tan-ank lilhanks-as
and the little coyote SG.jump-LOC-PF deer-OBJ
'And the little coyote having jumped on to the deer...'

Nez Perce also has a grammatical construction identical to that in Klamath (as was illustrated in example 23), but with a noncognate verbal suffix.[15] The Sahaptian cognate of the Klamath suffix -otn is probably -*te(n), which implies going somewhere in order to perform the action of the verb (in Sahaptin this suffix, -ta, additionally functions to mark the future). Example 24 is from Nez Perce.[16]

24) koná hi-ip-téen-e
there 3NOM-eat-GO-PST
'He went there to eat'

Thus two basic Sahaptian-Klamath verbs -- 'be' in Sahaptian and 'go' in Klamath -- have been reanalyzed as verbal suffixes to mark goal objects.

In Sahaptian associative objects co-occur with the verbal suffix -*tiwee(n), the verbal origin of which is clear from Sahaptin twana 'accompany'. The construction is illustrated by the following example from Nez Perce.

25) láwtiwaa-na pée-tuqi-twen-e miyóox̣ato-m
friend-OBJ 3.3-smoke-ASSOC-PST chief-ERG
'The chief smoked with a friend'

Example 26 illustrates the Klamath construction. That it derives from verb serialization with c'asgaay'as dola originally denoting 'accompanied Weasel' is indicated by the observation that dola is likely dol plus the indicative suffix -a, and that dol is probably cognate with Sahaptian *tiwee(n) 'accompany' (that Klamath has l here is probably due to consonant symbolism).

26) coy p'a-yeeg-a sqel c'asgaay-'as dola
and eat-begin-IND Old Marten Weasel-OBJ with
'And Old Marten began to eat with Weasel'

Tense-aspect-modality: The Klamath system of TAM suffixes is less developed than in Sahaptian (Nez Perce being the most developed of all). While etymologies can be postulated for most morphological formatives in all three systems, this is not relevant here. Perhaps the only comment that need be made is to note the similarity in both form and function between the Klamath indicative suffix -a and the Sahaptian past suffix -*e.

Another thing to note here is the similarity of the imperative in both Klamath and Sahaptian. In the Sahaptian n-stem imperatives regularly suffix nothing. Other stems, however, suffix either -*i or -*k. In Klamath -i and also -iik mark the imperative singular, while -ek is a 1st person singular hortative 'let me ...'. In Sahaptian plural imperatives suffix -*(i)tk (-(i)t plural plus the imperative -k). In Klamath the plural imperative is -(a)t.

Morphological causatives: Both Sahaptian and Klamath have morphological causatives. There are two prefixal causatives in Sahaptian, *hii- and *šeep-, and three in Klamath, s-, sne-, and hes-. All the Klamath causative prefixes seem to contain a formative s-, as does also the Sahaptian *šeep-. But if Sahaptian *šeep- contains a formative *š, the origin of the eep component is at present unclear.

For the Klamath causative sne-, it might prove insightful to compare the Klamath verb neebg 'happen, occur', which (assuming neebg contains the cislocative ebg) points to a possible morpheme ne 'do, make'. The Klamath-Sahaptian object suffix -*n(e) and verb stem marker -*n might also be related.

Klamath hes- is likely a cognate of the Sahaptian causative *hii-. An alternative possibility, however, is that the Klamath causative hes- contains he-, the allomorph of the reflexive-reciprocal which occurs before [s]. (This possibility was suggested by Scott DeLancey, personal communication.)

The Klamath classificatory prefixes: Klamath verbs of motion or manipulation inflect with verbal prefixes which classify an absolutive argument (patient subject in an intransitive clause, patient object in a transitive clause). For many of these classificatory prefixes there are probable etymologies within both Klamath and in Sahaptian that belie a nominal origin. For example, Klamath c'l^{e}- "a massive shapeless obj. (such as a piece of meat)" is obviously related to Klamath c'oleeks 'meat, flesh, body' and to Nez Perce cilåakt 'body', l^{v}- "a round [saliently 3-dimensional] obj." is likely connected with looq 'seed, core' and lolp 'eye' (probably a reduplication, cf. also Nez Perce silu 'eye', si- 'seeing'), qa- "a heavy or pronged object" is probably related to the Sahaptin qú 'heavy', and c'i- 'liquid in a container' might be related to Proto-Sahaptian *kewe- 'water' (but cf. also Klamath Gawam 'spring of water'). It is thus probable that the Klamath system of verbal classificatory prefixes are the result (a la Mithun 1984) of noun incorporation.

However, the system may simply (or also) represent an extension in the use of adverbial prefixes with instrumental force which were already a part of the parent Sahaptian-Klamath language. In support of this notion is the fact that, although the Klamath classificatory prefixes regularly agree with a manipulated patient, if an instrument is present in the same clause they will agree with it instead. For example, in 27 the verbal prefix ?- (saliently one dimensional) classifies the instrument (Old Marten's cane weapon), not the patient (the head which was cut off):

27) coy honk been sqel ?iime-tga
and that again Old Marten cane weapon-INSTR

?-akc'-a n'os
CL-cut off head-IND head
'And again Old Marten cut off the head with [his] cane weapon' (Stern 1951)

'Heads' are classified in Klamath by the verbal prefix for saliently 3-dimensional objects, l-:

28) n'os maat-s ?a l-enall-a
head 2PL-OBJ DECL CL-take away-IND
'[He] takes away your heads' (Stern 1951)

29) coy honkt-cgas l-akc'-a n'os
and that-next CL-cut off head-IND head
'And [he] cut off the next head' (Stern 1951)

The following Klamath classifiers (as listed in Barker 1963) have probable cognates in Sahaptian which are instrumental classifiers. As in Klamath, the Sahaptian morphemes are verbal prefixes. (For ex. 34-35, it may be noted that the sound correspondences between the palatals and velars in

Klamath-Sahaptian are as yet unclear.)

30) **d^v**- 'act upon a slender vertical object', and doo- 'act upon a prone long object, a long bundle, etc.'; cf. Nez Perce tiw'e- 'with a stick or pointed object' (Aoki 1970:85), also Nez Perce tuuk'e- 'with a cane-like object' (Aoki 1970:86), Sahaptin twa- 'with a long object' (Rigsby SG:67) or 'with a sharp implement' (Jacobs 1931:155, 162).

31) **qa**- 'act upon a heavy or pronged object'; cf. Nez Perce qi- 'with sticky matter' (Aoki 1970:85). Cf. also Sahaptin qú 'heavy'.

32) **sl^v**- 'act with a sawlike obj., with a toothed obj.'; cf. Nez Perce wisle- 'with implement' (Aoki 1970:86)

33) **w**- 'act with a long instrument'; cf. Nez Perce we 'with chopping instrument' (Aoki 1970:86), Shahaptin wa- 'with an implement' (Jacobs 1931:158)

34) **k^v**- 'act with a pointed instrument'; cf. Nez Perce cúu- 'with pointed object' (Aoki 1970:84), Sahaptin sú- 'with a long object' (Jacobs 1931:155, 162).

35) **c'a**- 'act on a handful of granular objs. (as sand, grain, beads, dried wokas, etc.)'; cf. Nez Perce 'ise- 'with knife (one object)' (Aoki 1970:86), Sahaptin sa- 'cut at with a knife' (Jacobs 1931:160).

NOTES

1 The sources for Klamath are the works of Barker, for Nez Perce those of Aoki, and for Sahaptin Jacobs (1931), Hymes (1975), Beavert and Rigsby (1975), and Rigsby (forthcoming). Most of the example sentences in Klamath are from the fieldnotes of Theodore Stern (1951), and most of the Nez Perce and Sahaptin examples are from my own fieldnotes. I wish to thank Theodore Stern for his valued comments on an earlier draft of this paper.

2 See Jacobs (1934), Aoki (1966), Lundsgaard (1967), and Rude (1986b).

3 Klamath kinship terms are described in Barker

(1964). Klamath _tis_ 'father' and _k'is_ 'mother' are probably cognate with Sahaptian _*toot_ 'father' and _*kee_ 'mother', with Klamath _k'is_ a likely example of diminutive glottalization. For other cognate Klamath-Sahaptian kinship terms, see Aoki (1963).

4 The Klamath kinship plural marker _-i(i)s_ (and also the Klamath suffix _-y_, the pluralizer for demonstratives) may possibly be cognate with the Nez Perce plural suffix _-i(i)_. Nez Perce _-i(i)_ is a verbal suffix which marks plural subject agreement. Also, _-i(i)_ is probably a component of the Sahaptian reciprocal prefix _*pii-_, and possibly even of the dual noun suffix _-*iin_.

5 Jacobs (1931:230): "The verb root -lai- ..., into or by water, may be cognate."

6 Besides the pronominal formatives mentioned in this section, there are other relevant correspondences, such as, for example, the pronominal clitic meaning 'also, too': Nez Perce _-k'e_, Sahaptin _-č'a_, and Klamath _-c'is_.

7 In Barker's orthography, which is employed here, the unaspirated-aspirated contrast is represented by _b_, _d_, _g_, etc., versus _p_, _t_, _k_, etc.

8 The copula in Sahaptian is _*wee_ and in Klamath _gi_. Klamath _gi_, however, functions for both 'be' and 'do'. 'Thus Klamath _gi_ and the Klamath verbal prefix _g^{v}-_ 'go' are probably both cognate with Nez Perce _kúu_ 'go, do'.

9 In Sahaptin _k_ > _č_ /___*i, *e.

10 The only potential cognate in Klamath which comes to mind is the reflexive/reciprocal verbal prefix _se-_.

11 Since Sahaptian _*pée-_ marks only singular objects, a reasonable etymology is the 3rd person pronominal _*bi_ (cf. Klamath _bi_) plus _-ée_, which in Nez Perce marks _individuated_ objects (when suffixed to certain adverbial morphemes) and _singular_ subjects (when suffixed to verbs).

12 Both Klamath and Nez Perce regularly preserve _*h_, e.g., compare the Nez Perce verb _hin_ 'say, tell' and adverbial prefix _him-_ 'act with the mouth' with Klamath adverbial prefix _han-_ 'act with the mouth' and verb _hem-_ 'talk, speak'. Cf. also Nez Perce _háacwal_ 'boy' and Klamath _hiswaqs_ 'man, male, husband'.

13 In Aoki's, Rigsby's, and Hyme's publications _c_ is used for [ts]. Since there is no contrast between [ts] and [č] in Klamath, in the _Klamath_ data in this paper _c_ will

designate [č].

14 Further comment on this cognate set will follow in another section below. Klamath *dola* 'with' is *dol* [cognate with Sahaptian **tiween* 'accompany'] plus the indicative suffix *-a*. In both Sahaptian and Klamath the sporadic alternation of *l* with *n* results from a diminutive consonant symbolism.

15 Locative or goal objects co-occur with the verbal suffix *-(n)úu* in Nez Perce and *-(n)awa* in Sahaptin, which is constructed from the past suffix *-*e* plus the copula **wée* (of which Klamath *waa* 'pl. live, stay, exist' is the probable cognate).

16 In Klamath the verbal suffix with the same function is *-ca*, i.e. *p'aca* 'go [somewhere] to eat'. There is as yet, however, no independent evidence of a Sahaptian *t* Klamath *c* sound correspondence.

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A NOTE ON HOPI CONSONANT GRADATION

David Leedom Shaul

Abstract: Residual exceptions to Heath's generalizations about i-ablaut in Uto-Aztecan languages from Hopi are examined. A -t- to -ts- alternation with shifting the final vowel of a CVCV root to i leaves some alternating pairs in Hopi.

In Heath's (1977, 1978) reconstruction of Proto-Uto-Aztecan (PUA) verb morphophonemics, a consonant gradation is reconstructed when a final vowel of a CVCV root is ablauted to /i/. This shift (-tV# to -tsi#) is induced by certain verb derivational suffixes (Heath 1977:32).

The remaining i-ablauted verb stems in Hopi generally follow Heath's reconstruction.

aptu 'adequate'	aptsi-wta 'be equal amount'
hoota 'back' (noun)	hootsi-wta 'go along zigzagging' (cf. hoota-nta 'be flexing')
höta 'open it'	hötsi '1. open 2. hole'
	hötsi-wa 'doorway'
	hötsi-wta 'ajar'
iita 'hold it in front of self'	iitsi-wta 'be sticking out'
ko'olta 'store it away'	koltsi 'shelf' (noun)
kuuta 'overturn container'	kutsi-psö 'underarm'
	kutsi-tsanta 'take it under one's arm'
kweeta 'brush it aside'	kwets-ta 'move dirt'
kwusu 'bring it'	maa-kwusti 'grasp in hand' (maa 'hand')
leeta 'lay it across'	leetsi '1. bolt/bar 2. line/row'
maata-kna 'display it'	maatsi-wa 'be called/named'
paato 'explode'	paatsi 'waterfall'
	paatsi-kna 'cause to burst'
pitu 'arrive'	pitsi-na 'attain/seem'
	pitsi-wta 'reach as far as'
qatu 'sit/stay/remain'	qatsi 'life'
uuta 'close it'	uutsi 'closure device'
	uutsi-wta 'be closed in'
wuuta 'pours it'	wuts-ta 'bail it out'

In these examples, either i-ablaut occurs by itself to produce nouns, or it is the consequence of one of the i-ablauting suffixes: -(i)wa 'stative', -(i)va 'desiderative' (from *-(i)pai), -(i)na 'punctual' (in Hopi, causative), and perhaps the suffix

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-*(i)lti* 'become'. The -*k*- and -*n*- intermediate suffixes are thematic class markers.

There are a handful of exceptions to Heath's reconstruction. In two cases, we find roots with i-ablaut applied, but without a medial -*t*- in the input.

nawus 'must' (modal)	nawutsi 'take a long time' nawuts-na 'pass a long time'
oopo-kna 'fill to capacity'	ootso-kna 'fill up'

In two other cases, it seems that i-ablaut has not been applied, even though the -*ts*- gradation is evident.

tsövu 'elbow' (from *to 'curve + *pɨ 'participle')

mömtsa 'bite all over'
möötsi-kna 'grip in teeth'

In the first root, which has cognates in Yaqui-Mayo and Cora-Huichol (Miller 1965:#37), /t/ has become /ts/ without i-ablaut. This is also true of the example with *oopo* 'full' above. *Mömtsa* points to a root *mööta* (unattested), which must underlie *möötsikna*.

In a single stray form, given below, i-ablaut appears in the first member of a compound noun.

puwvits-tawi 'lullaby'

The first member is related to *puw-va* 'go to sleep' (*puuwi* 'sleep' with -*va* 'inceptive'); the i-ablauted gradation -*ts*- in *puwvits*- probably comes from -*ta* 'durative'. The element *tawi* is the combining form of *taawi* 'song'.

It remains to be seen whether this residue is due to a psychological extension of the *t* to *ts* gradation, or whether, at earlier times, the gradation was independent of i-ablaut though generally co-occurring with it, and/or consonants other than -*t*- could be changed to -*ts*-, much as final vowels */ɨ u o a/ could change to */i/.

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WORD ORDER IN KLAMATH

Karen Sundberg

Abstract: Klamath, a Native American language of Oregon, has particularly "free" word order. Methods developed by Givón (1983) for the measurement of topic continuity, when applied to Klamath narrative texts, show that the position of NP's relative to the verb is not random, but determined by discourse-pragmatic factors.

Word order in Klamath, a Penutian language of southern Oregon, has been described as "almost completely free" (Barker 1964:341). Barker demonstrates that major arguments within the clause can occur in all logically possible combinations. This paper will demonstrate, however, that in discourse the occurrence of NP's in pre- or post-verbal position is not random, but is heavily influenced by pragmatic factors.[1] This paper examines the effect of the relative topicality of arguments on their position preceding or following the verb. The degree of topicality is determined using five measures of topic continuity developed by Givón (1983) and one additional measure.

The data base consists of seven Klamath texts from Barker 1963: five traditional myths and two ethnographic and procedural texts,[2] altogether comprising 761 usable clauses. In this study, the position of subject, object, and locative noun phrases are analyzed as to the degree of topic continuity encoded in relation to the verb. Unstressed pronouns, though restricted to clause second position, are also analyzed for their topic continuity properties in relation to other categories. The prediction, based on the results reported in Givón 1983, that post-verbal position tends to code more highly continuous topics, and pre-verbal position more discontinuous topics, is confirmed for all noun phrase categories in Klamath. All coding categories, in turn, are seen to rank on a continuum from most continuous, the unstressed pronouns, to the least continuous, the locative NP's, as predicted by the topicality hierarchy proposed by Givón.

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We will first briefly outline the quantitative methods for assessing topicality used in this study (for a more complete exposition of the methodology and the assumptions underlying and deriving from it, see Givon 1983; there can also be found the previous work producing the conclusions on which the predictions assumed in this paper are based). Succeeding sections will then describe the Klamath constructions which were investigated, the numerical results, and the conclusions which can be drawn about the function of word order in Klamath.

METHODOLOGY

The methodology devised by Givón (1983) for assessing relative topicality of NP's in text involves counting the number of clauses intervening between the NP and the last previous mention and next following mention of its referent in the text, and other measurements which will be described below. Five measurements described in Givón 1983 were applied to Klamath texts: the three anaphoric counts of referential distance, potential referential interference, and same vs. different subject; and two cataphoric counts of persistence and contiguity to major thematic breaks. In addition to these, a count of the number of new referents introduced into the text was made for each noun phrase category.

The texts were first divided into individual constituent clauses, each containing a single finite verb. Relative clauses and tightly-bound complement clauses (i.e. those with subject coreferential to that of the main verb) were not counted as separate clauses; e.g. (1) is counted as a single clause:

(1) coy solwo:lgis san'a:Wawli ?at,
and gather together clothlike obj. want now,

na:nok wic'o:L-as
all fishnet-OBJ

'Then [they] all wanted to gather together
the fishnet.' (26:47)[3]

Clauses repeated for emphasis or other stylistic reasons, as (2), were not counted as separate clauses:

(2) coy sa honk ?at gena, gena, doscn'a, doscn'a
and they now go, go, run, run
'Then they went and went, ran and ran.'

Elements within quotations were not measured for topic continuity, but the quotative margin and quoted portion were counted together as a single clause. If no quotative margin was present, the quoted portion counted as an instance of subject zero-anaphora (see below) for the speaker.

Occasional interruptions and background interpolations by the narrator were deleted for purposes of the study, and resumption of the narrative counted as a thematic break except when the interruption occurred clause-medially, as in:

(3) coy honk[4] cew -- dam mat cew q'ay ni
and Antelope -- INT EVID Antelope NEG I

s?aywakta -- kani ?a gatba
know -- someone DEC arrive

'And then Antelope -- did they say Antelope?
I don't know -- someone arrived.' (3:109)

Thus counted the data base totalled 761 clauses.

The measurements which were applied to the texts are as follows:

Referential Distance (RD): To determine the referential distance (RD) between a particular token and its last reference in the preceding discourse, the number of clauses between the token and the last clause with the same referent is counted. The minimum possible value of 1 shows a referent to be maximally topical, while an arbitrary maximum value of 20 clauses shows a referent to be maximally discontinuous. Absence of a referent within direct quotation was not counted as a gap, but occurrence within quoted material was counted as occurrence. Indefinites were not subject to this measurement, as they by definition represent the first occurrence of a referent in the text.

Potential Referential Interference (PRI): The number of referents occurring in the preceding 3 clauses which are semantically compatible with the predication of the referent for which counts are being made is taken as a measure of the potential ambiguity of the referent and the effect it has on the choice of coding strategy. A value of 0 the indicates no potential for ambiguity; a value of 1-3 indicates high potential for ambiguity. (This measure likewise cannot be applied to indefinites).

Persistence: As a measure of importance in the discourse, the number of occurrences of the referent was counted in the 10 clauses following that in which the token occurs. For subjects, only subsequent occurrences *as subject* were counted; for objects and locatives, occurrence in any role was counted. The minimum possible value of 0 indicates low discourse importance (except for paragraph-final occurrences); the maximum value of 10 indicates a high discourse importance of the referent. Occurrences within direct quotation were counted, while absence was not counted as a gap. As this measurement is cataphoric, it can be applied to indefinites as well as definites.

Same-Subject (SS) vs. Different-Subject (DS): To determine the switch-reference functions of SV and VS patterns, the subject of the preceding clause was determined to be the same or different. And example of a SS pattern occurs in the second clause of (4); an example of DS in the second clause of (5):

(4) coy detdeye:mi-pk-s papakpakkanga,
and (DIST)hungry-DUR-NOM (DIST)(INT)bark around

hok-t w'awk'a
that-REF little coyotes

'Then, being hungry, those little coyotes
barked around here and there.' (3:106)

(5) ... hontba, hehji:k'a-lam-ksi.
land, Hehji:k'a-GEN-place.

hehji:k'a cawaltk mna wqepl'aqs-dat
Hehji:k'a sitting on top his summer-house-LOC

'... [it] landed at Hehji:k'a's place.
Hehji:k'a had been sitting on top of his
summer house.' (8:2-3)

Contiguity to Major Thematic Breaks: The paragraph boundaries indicated by Barker in the texts were taken as major thematic breaks for purposes of this measurement, in addition to breaks occasioned by interpolated comments by the narrator. If a referent occurred in the initial clause of a thematic unit, it was counted as paragraph initial. All other occurrences were classified as paragraph non-initial. However, if two referents were introduced in separate clauses at the beginning of a unit, both occurrences were counted as paragraph initial, as in the beginning of the story of Old Bear and Antelope:

(6) wit'e:m la:b-a wewe:?as gitk.
Black Bear two-OBJ children have

cew l:ab-a wewe:?as gitk.
Antelope two-OBJ children have

'Black Bear had two children. Antelope had
two children.' (1:1-2)

Introduction of New Referents: This was a count to determine for each initial occurrence of a referent the particular order in which it was introduced. This is another type of discontinuity which overlaps somewhat with the contiguity at thematic junctures and with the referential distance. This count was applied to all noun phrase categories.

OBJECTS OF INVESTIGATION

The grammatical devices investigated in this study are unstressed third person pronouns, subject and object noun phrases, both definite and referential-indefinite, in pre- and post-verbal positions; and locative noun phrases both preceding and following the verb. As the category of zero anaphora was required in the methodology, a brief description of the phenomenon in Klamath follows.

Zero Anaphora: Zero anaphora is the most frequently used subject-coding device in Klamath, and is also used for objects, though less often. The following exemplifies both subject and object zero anaphora:

(7) coy sl'o:los-dat pnipno:Goga
and elder twig-LOC (DIST) blow into a container
'Then [he] blew [them] into an elder twig.'
(1:141)

Anaphoric zeros were not measured for topic continuity but were counted as referential in determining the continuity of the categories which were measured.

Unstressed Pronouns: Unlike most languages with free word order, Klamath has no obligatory agreement system. Pronouns, when they do occur, occur in clause-second position. The following examples illustrate subject and object pronouns:

(8) coy sa na:nok waytas ge:s?alca
and 3pl every day go to gather ipos
'And every day they went to gather ipos.' (1:3)

(9) coy honk sa-s dom p'as se:w'a
and 3pl-OBJ much food think
'And [she] thought they ate a lot.' (1:49)

Klamath has no noncontrastive third person pronoun as such; instead demonstratives are used with third person anaphoric reference. (No examples of the contrastive third person pronoun occurred in the seven texts examined). In order to distinguish pronominal from other functions of the demonstratives, only demonstratives marked with the "referential" suffix -t were counted as tokens; an example of a third person pronominal object is:

(10) coy honk honk-t poLq'ank,
and that-REF having plucked,

?at no:ql'ank, coy sa p'an
now having roasted, and 3pl eat

'And having plucked it, then having roasted [it], then they ate.' (8:27)

Subject Noun Phrases

Definite Subjects: Klamath also lacks an elaborate case-marking system for nouns. There is no morphological subject marking, and a single object marker which marks datives obligatorily and transitive patients optionally. (Factors governing object marking will be discussed below). Subject NP's may precede or follow the verb:

(11) hehji:k'a cawaltk mna wqepl'aqs-dat
Hehji:k'a sitting on top his summer-house-LOC
'Hehji:k'a had been sitting on top of his summer-house ...' (8:3)

(12) coy be:n hak hottGic'apga hehji:k'a
and again EMPH come running down off Hehji:k'a
'And again Hehji:k'a came running down.'(8:78)

Often subject NP's are preceded and/or followed by a demonstrative or personal pronoun, which may modify the noun or count as a double occurrence. If these occurred on the same side of the verb, as in (13), they were counted in this study as a single occurrence:

(13) coy honk hok-t c'asga:y c'igatk-damna   ?ambo
     and   that-REF Weasel fetch liquid-HAB water
     'And that Weasel used to go fetch water ...'
     (10:8)

However, if the noun and the coreferential demonstrative occurred on opposite sides of the verb, as in (14), neither was counted, as the position of the NP relative to the verb cannot be determined as one or the other:

(14) ma:ns hok q'e:gi,   hok w'ak'a
     long that be absent, that Little Coyote
     'And he was gone a long time, that Little
     Coyote.'   (3:92)

The small number of occurrences of this latter pattern in the texts (a total of 4) did not warrant the creation of a separate category.

Referential-Indefinite Subjects: Referential indefinite noun phrases include first mention of inanimates, as well as occasional animates which were either preceded by a quantifier, as la:ba wewe:?as in (15), or were not proper names of well-known mythical characters, as Ga:q in (16):

(15) wit'e:m   la:b-a wewe:?as gitk
     Black Bear two-OBJ children have
     'Black Bear had two children.'   (1:1)

(16) coy honk Ga:q honk kiko:cn'a
     and   crow that (DIST) poke w. sharp instr.
     'Then a crow speared them with its beak.'(2:27)

All referential-indefinite subjects in the texts precede the verb, as in ex. (16).[5]

Object Noun Phrases

Definite objects: There is only one object marker on nouns in Klamath, occurring always on datives and generally on animate patients of transitive verbs.[6] In this study I have treated all object-marked NP's as belonging to a single category.

Object NP's occur in both pre- (17) and post-verbal (18) position:

(17) coy honk ?at gaba:tis ce:,
and now go to shore upon

sdaynas honk sl'oGi
heart that(OBJ) swallow

'And upon reaching the shore, [he_i] swallowed
his_j heart.' (3:26)

(18) gmok'am'c sat'wa:ya maqlaqs-as
Gmok'am'c help people-OBJ
'Gmok'am'c helped the Indians.' (26:61)

As is the case with subject noun phrases, so with objects a small number of clauses (4 in the sample) occur in which coreferential elements occur on each side of the verb. Again, these were not counted.

Referential-Indefinite Objects: This category can occur pre-verbally (as in ex. (15)) and, unlike referential-indefinite subjects, also post-verbally, as in:

(19) wit'e:m'am'c c'aGi: Ge:s
Old Bear put handful in mouth ipos
'Old Bear put a handful of ipos into her mouth.'
(1:14)

Locative Noun Phrases: The majority of locative NP's follow the verb, as in:

(20) coy ksembli wqepl'aqs-dal' mna
and take living obj. back summer-house-to his
'Then [he] took [it] back to his summer-house.'
(8:25)

Less often they precede, as in:

(21) coy honk ?at go:s-dat dalmi
and now tree-LOC look up
'Then [he] looked up in the tree.' (3:109)

NUMERICAL RESULTS[7]

Topic Continuity Properties of Subjects

Referential Distance: Table 1 presents the average values of referential distance for the various categories of subject NP:

	N	RD
PRONOUN	132	1.30
VS order	36	3.92
SV order	89	7.82

TABLE 1: Average Referential Distance (in Number of Clauses) for Subjects

The categories rank predictably on a continuum from the most continuous with the lowest referential distance, the PRO category, to the least continuous with the highest average RD value, the pre-verbal full NP subjects. The value for post-verbal full NP subjects ranks approximately halfway between the others, tending to code topics of higher continuity than the SV category, but not so high as the more continuous PRO category.

In Table 2, the variation of tokens within each category is presented:

no. of	PRO		VS		SV	
clauses	N	%	N	%	N	%
1	108	82	18	50	34	38
2	11	08	7	19	9	10
3	5	04	3	08	5	06
4	3	02	1	03	3	03
5	3	02	1	03	1	01
6	1	0.7	--		4	05
7	--		1	03	1	01
8	--		1	03	--	
9	1	0.7	--		1	01
10			--		2	02
11			--		--	
12			--		3	03
13			--		--	
14			--		--	
15			--		--	
16			--		1	01
17			1	03	--	
18			--		--	
19			1	03	--	
20+			2	06	25	30
Totals	132		36		89	

TABLE 2: Percent Distribution of Referential Distance within Subject Categories

82% of all occurrences of PRO subjects are seen to cluster at the 1 clause range; 77% of all VS occurrences in the 1-3 clause range, while the SV category shows clustering at the two extreme ends of the scale, with 64% occurring within 1-7 clauses, and 30% showing maximal RD at the 20+ clause range.

Potential Referential Interference: The average values for the number of potentially interfering referents in the preceding three clauses are recorded in Table 3:

	N	PRI
PRO	132	0.40
VS	36	0.86
SV	89	1.02

TABLE 3: Average Potential Referential Interference for Subjects

These results again follow the predicted pattern, with the PRO category having the least potential for ambiguity, and therefore coding more continuous referents than the VS category, which in turn has fewer interfering referents than the SV category, the SV ordered NP's again coding topics with the lowest degree of continuity.

Table 4 presents the distribution of potential interference across the categories, i.e. the percentage of the total number of pronominal, post-verbal, and pre-verbal subjects for which there could be found in the preceding 3 clauses 1,2, or 3 distinct referents which could plausibly be interpreted as the subject of the clause under consideration:

PIR	PRO		VS		SV	
	N	%	N	%	N	%
0	80	61	10	28	18	20
1	51	39	21	58	53	60
2	1	0.75	5	14	16	18
3					2	02
4+						

TABLE 4: Percent Distribution of Tokens with 1, 2, and 3 Potentially Interfering Referents (PIR) Preceding Three Clauses

We see that the highest percentage of pronouns (61%) have no interfering referents in the preceding clauses; the majority of full NP subjects in both VS and SV patterns have one interfering referent, with the SV category showing a slightly higher percentage of both 1 and 2 interfering referents than the VS category, as well as having the only tokens with 3 such interfering referents.

Persistence: The results for this measurement are given in Table 5:

	N	Persistence
PRONOUN	132	2.13
VS DEFINITE	36	1.36
SV DEFINITE	89	1.98
VS REF/INDEF	0	N/A
SV REF/INDEF	15	0.53

TABLE 5: Average Persistence (in Number of Clauses) across Subject Categories

As a measure of discourse importance, the categories are ranked differently than for the anaphoric measures; pronouns show the highest persistence, the SV/DEF category persists longer than the VS/DEF category, while the REF-INDEF category (all SV) decays most rapidly in the discourse register. The average values obtained for the definite categories reflect their position within thematic units:

pronouns nearly always occur in paragraph medial and final clauses, and, being the most continuous category, (as reflected in the results for RD and PRI), are most likely to be a major component[8] in long equi-subject clause chains. The SV category, more often found in paragraph initial clauses, is most likely to initiate such chains, the two categories together tending to persist throughout the thematic unit. The VS category encodes less continuous referents than the PRO category, and rarely occurs in paragraph initial clauses (which are more typically SV), and so tends to persist for a shorter duration than either the PRO or SV categories.

All referential-indefinite subject NP's occur in the pre-verbal position, this category having by far the lowest persistence. This reflects the tendency in Klamath and other languages (cf. Givón 1983) to introduce major topics as definites or objects, and highly unimportant referents, which decay almost immediately, as indefinites.

The distribution within categories is presented in Table 6:

no. of	PRO		VS		SV		SV-REF/INDEF	
clauses	N	%	N	%	N	%	N	%
0	38	29	17	47	30	34	9	60
1	35	27	8	22	22	25	4	27
2	19	14	4	11	11	12	2	13
3	12	09	3	08	8	09		
4	7	05	1	03	8	09		
5	6	05	1	03	2	02		
6	4	03	1	03	2	02		
7	3	02	--		2	02		
8	2	02	--					
9	--		1	03	--			
10+	6	05			4	04		
Totals	132		36		89		15	

TABLE 6: Percent Distribution of Persistence within Subject Categories

At least 70% of the tokens in each category occur in the 0-1 clause range, with the REF/INDEFINITE category having 100% of its tokens within this range; the VS category having 80%, the SV category 71%, and the PRO category 70%, with the largest number of tokens in the 3-10+ clause range.

Same-Subject vs. Different Subject: The relative distribution of SS and DS occurrences for the definite categories is presented in Table 7:

	SS		DS		TOTAL	
	N	%	N	%	N	%
PRO	91	69	41	31	132	100
VS*	19	53	17	47	36	100
SV*	21	24	68	76	89	100
TOTAL	131	51	126	49	257	100

TABLE 7: Relative Distribution of SS vs. DS Occurrences within Subject Categories *Definite NP's only

As expected, the PRO category shows the highest ratio of SS to DS occurrences, (69% vs. 31%), the VS category an intermediate ration (53% vs. 47%), and the SV category the lowest ratio (24% vs. 76%). As yet another measure of topic continuity, the categories rank in the same order as in the RD and PRI measurements, with pronouns showing the highest degree of continuity to the preceding clause, VS ordered NP's the next highest, and SV ordered NP's the lowest degree, i.e. the most highly discontinuous to the preceding clause.

Contiguity to Major Thematic Breaks: Table 8 presents the relative distribution of occurrences at thematic junctures as opposed to thematic continuations for each category:

	BREAK		CONTINUATION		TOTAL	
	N	%	N	%	N	%
PRO	9	07	123	93	132	100
VS-DEF	7	19	29	81	36	100
SV-DEF	48	54	41	46	89	100
VS-R/I	0		0		0	
SV-R/I	1	07	14	93	15	100
TOTAL	65	24	207	76	272	100

TABLE 8: Relative Distribution of Contiguity to Thematic Break vs. Thematic Continuation within Subject Categories

As noted above, the great majority of PRO occurrences (93%) are in paragraph non-initial clauses; to a somewhat lesser extent this distribution is replicated by the VS category, with 81% of its tokens in non-initial clauses. In contrast, over half the SV tokens (54%) are in paragraph initial clauses. Again, the PRO category is shown to be the most continuous, the SV category the least continuous, and the VS category ranking between the two.

Almost all of the referential-indefinite NP's (93%) occur in paragraph non-initial clauses. This correlates with the results obtained for the persistence measurement: as highly unimportant referents, they are unlikely to initiate equi-topic chains; rather, they are satellite topics which are most often introduced in the middle or toward the end of the thematic unit, decaying almost immediately in the discourse.

Topic Continuity Properties of Objects

Referential Distance: Table 9 presents the average values for referential distance for the definite object categories:

	N	RD
PRONOUN	44	1.70
VO order	45	6.04
OV order	30	9.97

TABLE 9: Average Referential Distance (in number of clauses) for Objects

As with the subject categories, these are ranked as expected on a continuum form the most continuous, the PRO category, to the least continuous, the OV category, with the VO category intermediate between the other two. The distribution within categories is given in Table 10:

no. of	PRO		VO		OV	
clauses	N	%	N	%	N	%
1	33	75	15	33	10	33
2	5	11	11	24	3	10
3	1	02	1	02	--	
4	2	05	2	05	1	03
5	1	02	3	07	1	03
6	--		1	02	--	
7	--		--		--	
8	2	05	--		--	
9			--		2	07
10			3	07	--	
11			--		--	
12			--		--	
13			1	02	--	
14			--		--	
15			--		--	
16			--		1	03
17			--		--	
18			--		--	
19			--		--	
20+			8	19	12	40
TOTALS	44		45		30	

TABLE 10: Percent Distribution of Referential Distance within Object Categories

75% of all PRO occurrences are within the 1 clause range. Seventy-one percent of the VO occurrences are between 1-5 clauses, with 19% at the 20+ clause range. The OV category, like SV, exhibits clustering at the two extreme ends, with 43% in the 1-2 clause range, and a relatively high 40% at the 20+ clause range, indicating that objects as well as subjects are most likely to be introduced or reintroduced in pre-verbal position, as will be demonstrated further below.

Potential Referential Interference: Tables 11 and 12 present the average values for potential interference and the distribution within the definite object categories:

	N	PIR
PRO	44	0.25
VO	45	0.22
OV	30	0.70

TABLE 11: Average Potential Referential Interference for Objects

PIR	PRO		VO		OV	
	N	%	N	%	N	%
0	34	77	35	78	14	47
1	9	20	10	22	11	37
2	1	02			5	17
3+						

TABLE 12: Percent Distribution of Tokens with 1 or 2 Potentially Interfering Referents in (PIR) Preceding Three Clauses

Both the pronouns and the VO ordered NP's show no interfering referents in the preceding 3 clauses. The average value for the OV category is higher, with 54% of the tokens having 1 or 2 interfering referents in the preceding 3 clauses. The PRO and VO categories, then, tend to code more continuous referents, while the OV category, the most discontinuous, is the preferred order in potentially ambiguous predications.

Persistence: Table 13 presents the average values of persistence for the object categories:

	N	Persistence
VO REF/INDEF	15	0.27
OV REF/INDEF	27	1.22
PRONOUN	44	1.36
OV DEFINITE	45	1.60
VO DEFINITE	30	2.80

TABLE 13: Average Persistence (in Number of Clauses) across Object Categories

The VO-ordered definite NP's show the highest average value; this category thus tends to code both highly continuous and important referents, whereas the OV-ordered definite NP's code discontinuous referents which decay more quickly in the discourse register. The PRO category has a relatively low persistence, as this category is not used to code new topics, and is most often found in paragraph non-initial clauses.

The majority of referential-indefinite objects occur in the OV order, and this category has a lower persistence than the definite categories, indicating the relative unimportance of the topics encoded by them. Lowest of all, however, is the VO ordered referential-indefinite category, which nearly always constitutes unique mention in the discourse. These are extremely unimportant referents, the action of the verb itself usually being the most salient in the predication, thus tending to precede the object, as in ex. (22):

(22) coy honk ?at not'o:t'le:Gi,
and now throw round obj. across,

waGe:nha cacga:lam
maybe pine cone

'And then [he] threw [something] across,
maybe a pine cone.' (1:130)

The distribution within categories is recorded in Table 14:

no. of clauses	VO-R/I N	VO-R/I %	OV-R/I N	OV-R/I %	PRO N	PRO %	OV-DEF N	OV-DEF %	VO-DEF N	VO-DEF %
0	12	80	13	48	20	45	13	43	18	40
1	2	13	4	15	12	27	6	20	5	11
2	1	07	4	15	3	07	4	13	3	07
3			3	11	3	07	1	03	3	07
4			3	11	3	07	3	10	2	04
5					--		2	07	3	07
6					1	02	--		3	07
7					1	02	--		3	07
8					1	02	--		3	07
9							1	03	--	
10+									2	04
Totals	15		27		44		30		45	

TABLE 14: Percent Distribution of Persistence within Object Categories

Seventy-two percent of the PRO category shows a low persistence in the 0-1 clause range; the majority of the OV-DEF category (76%) occurs in the 0-2 clause range; and the VO-DEF category again shows the greatest persistence, with 76% distributed in the 0-5 clause range and the only tokens having the maximum persistence of 10+ clauses. Eighty percent of the VO-REF/INDEF category decays immediately at 0 clauses, and 78% of the OV-REF/INDEF NP's occur in the 0-2 clause range. The REF/INDEF categories also have the least dispersed distribution, with no tokens occurring beyond 2 clauses and 4 clauses, respectively.

Topic Continuity Properties of Locatives

Referential Distance: The results for this measurement are recorded in Tables 15 and 16:

	N	RD
V-LOC NP	30	10.93
LOC NP-V	9	17.55

TABLE 15: Average Referential Distance (in number of clauses) for Locative NP's

no. of	V-LOC NP		LOC NP-V	
clauses	N	%	N	%
1	5	17	--	
2	2	07	--	
3	1	03	--	
4	3	10	--	
5	--		--	
6	1	03	--	
7	--		--	
8	2	07	--	
9	2	07	2	22
10	1	03	--	
11	--		--	
12	--		--	
13	--		--	
14	1	03	--	
15	--		--	
16	--		--	
17	--		--	
18	--		--	
19	--		--	
20+	12	40	7	78
TOTALS	30		9	

TABLE 16: Percent Distribution of Referential Distance within Locative NP Categories

The majority of locative NP's are post-verbal, showing lower referential distance. A smaller number of locatives occur in pre-verbally; most of these are highly discontinuous, first-mention referents, as can be seen from their distribution in Table 16. The VO occurrences show a more scattered distribution throughout the 1-20 clause range, indicating the somewhat greater continuity of this category, although the locative NP category as a whole is low in topicality as compared to the subject and object categories.

Persistence: Tables 17 and 18 present the average values for persistence and their distribution within the locative NP categories:

	N	Persistence
V-LOC NP	30	0.67
LOC NP-V	9	0.22

TABLE 17: Average Persistence for Locative NP's

no. of clauses	V-LOC N	V-LOC %	LOC-V N	LOC-V %
0	18	60	7	78
1	9	30	2	22
2	1	03		
3	--			
4	1	03		
5	1	03		
6				
7				
8				
9				
10+				
TOTALS	30		9	

TABLE 18: Percent Distribution of Persistence within Locative NP Categories

The majority of occurrences for both the V-LOC and LOC-V orders are shown to have no persistence; the V-LOC, however, contains 30% which persist for one clause, and a few tokens which persist for 2-5 clauses. Therefore, although the locative NP category in general tends to code relatively unimportant referents, the more important of these occur post-verbally, in the more continuous order.

Introduction of New Referents into the Discourse: Table 19 presents the number of first-mention referents occurring in the post-verbal and pre-verbal order for each NP category:

	V NP		NP V		TOTAL	
	N	%	N	%	N	%
SUBJECT						
DEFINITE NP	1	03	28	97	29	100
REF/INDEF NP	0		11	100	11	100
TOTAL SUBJECT	1	02	39	98	40	100
OBJECT						
DEFINITE NP	7	35	13	65	20	100
REF/INDEF NP	12	32	25	68	37	100
TOTAL OBJECT	19	33	38	67	57	100
LOCATIVE	10	59	7	41	17	100

TABLE 19: Introduction of New Referents into Discourse

Ninety-eight percent of the new subject NP's, both definite and referential-indefinite, are introduced in preverbal order, this being another strong indication of the discontinuity of the referents expressed in that order. For the two object categories, 67% are also introduced in pre-verbal order; again a measure of the discontinuity of that order, though to a lesser extent for objects. For locative NP's, numerically more referents are introduced in post-verbal position (59%); however, as the great majority of all locative NP's occur in this order, this amounts to only 33% of all the post-verbal NP's, whereas the number of first-mention referents amounts to 78% of all pre-verbal NP's. Pre-verbal order, then, is the preferred mode for introducing new referents of all major case roles into the discourse.

Word Order Distribution: The distribution of the NP categories in the pre-verbal and post-verbal orders is summarized in Table 20:

	V NP		NP V		TOTAL	
	N	%	N	%	N	%
SUBJECT						
DEFINITE NP	36	29	89	71	125	100
REF/INDEF NP	0		15	100	15	100
TOTAL SUBJECT	36	26	104	74	140	100
OBJECT						
DEFINITE NP	45	60	30	40	75	100
REF/INDEF NP	15	36	27	64	42	100
TOTAL OBJECT	19	33	38	67	57	100
LOCATIVE	30	77	9	23	39	100

TABLE 20: Distribution of Word Order

Here the distribution across the major cases is surprising with respect to the general tendencies exhibited by the major case-roles in the results above, as will be discussed further in the last section of this paper. The pre-verbal order, demonstrated to be the least continuous both within and across categories in terms of all 6 measurements, has the highest percentage of subject NP's, the most continuous case-role on the topicality hierarchy, and the lowest percentage of locative NP's, the least continuous case-role on the topicality hierarchy, with the object NP's ranking midway between the two. The reverse is true for the post-verbal order, demonstrated above as the more continuous order. For the subject categories, this skewed distribution results in part from the greater functional load of the SV order: it is used for introducing and re-introducing referents into the texts, in potentially ambiguous predications, following DS clauses, and at the start of thematic units. The VS order, on the other hand, is most often used when none of the above conditions are present, i.e. when the referent is predictable and expected. Furthermore, use of the VS order is complemented by the use of zero-anaphora and unstressed pronouns in coding more continuous referents, thus decreasing its overall frequency of occurrence. There are more discourse environments in which the pre-verbal, SV, order is the preferred order for coding referents, and this accounts for the greater number of occurrences of SV order.

For locative NP's the distribution is explained by the relative continuity within the category. As we have seen, the V-LOC order codes more highly continuous locative NP's than the LOC-V order. In fact, 60% of the occurrences had been previously mentioned, and 40% were seen to persist for at least 1 clause, as compared to only 22% of previously mentioned referents in the LOC-V category, and 22% which showed an persistence whatever. The greater number of post-verbal locative NP's, then, is due to the greater number of continuous referents within that category.

Table 21 shows the distribution of major word order patterns in transitive clauses containing two NP arguments.

WORD ORDER	no. of occurrences
SVO	7
SOV	5
VSO	2
OVS	1
OSV	0
VOS	0

TABLE 21: Distribution of Word Order Patterns

As can easily be seen, this type of clause is extremely rare in Klamath, as NP's are the least frequent coding device for subjects. The small number of occurrences in any of the orders does not warrant establishing for Klamath a basic word order in the sense of Greenberg (1966), as is the case for many other free word order languages (cf. Mithun to appear).

Animacy: Klamath shows the expected correlation between case role and the percentage of animate vs. inanimate topics, as presented in Table 22:

	ANIMATE		INANIMATE		TOTAL	
	N	%	N	%	N	%
SUBJECT	135	96	5	04	140	100
OBJECT	61	52	56	48	117	100
LOCATIVE	1	06	16	94	17	100

TABLE 22: Percent of Animate vs. Inanimate NP's in the Major Case-role Categories

Subjects are overwhelmingly animate, reflecting the topical importance of the referents encoded as subject; objects are roughly equally divided between animate and inanimate, and locatives are nearly always inanimate, indicating the relative unimportance of the topics expressed as locative NP's. As will be discussed below, the results obtained for animacy correlate closely with those obtained for both the Persistence and PRI measurements.

DISCUSSION

RD and topic continuity within and across case-roles: The average values of referential distance within the major case roles are repeated below for convenience:

	SUBJ	OBJ	LOC
PRO	1.30	1.70	---
V-NP	3.92	6.04	10.93
NP-V	7.82	9.97	17.55

Two parallel tendencies in the coding of the topicality of referents are evident in these results: within case roles, the grammatical devices can be ranked from the most to the least continuous as follows:

(23) PRO > V-NP > NP-V

and across case-roles, the following continuum is evident, following the same gradient of topic continuity:

(24) SUBJECT > OBJECT > LOCATIVE

This gradation in terms of topic continuity of both case roles and grammatical categories confirms the predictions resulting from the studies in Givón 1983. Within the case roles, pronouns clearly code the most continuous referents, post-verbal NP's code referents of intermediate continuity, and pre-verbal NP's clearly code the least continuous referents, therefore the most inaccessible to the speaker and hearer. Across case roles, subjects overall code the most continuous topics in terms of referential distance, objects code topics of intermediate continuity, and locatives referents of low continuity in the preceding discourse.

In Tables 23 and 24, the degree of topic continuity encoded by the grammatical devices and the case roles, respectively, is expressed as the percentage of tokens in each category having a referential distance of 1-2 clauses, the range showing maximal continuity of referents. In Table 23, 89% of the PRO category is shown to have a low RD of 1-2 clauses; 53% for the entire post-verbal category, and 44% for the entire pre-verbal category:

	TOTAL SAMPLE N	%	RD of 2.0 or less N	%
PRO	176	100	157	89
V-NP	111	100	58	52
NP-V	128	100	56	44

TABLE 23: Percentage of Tokens of each Type with RD of 2.0 or Lower

In Table 24, the major case-roles are similarly ranked, with 73% of all subjects having a low RD of 1-2 clauses, 65% of all objects, and only 18% of locatives:

	TOTAL SAMPLE N	%	RD of 2.0 or less N	%
SUBJ	257	100	187	73
OBJ	119	100	77	65
LOC	39	100	7	18

TABLE 24: Percentage of Tokens in each Case-Role with RD of 2.0 or Lower

PRI, Animacy, and Topic Continuity: The percentage of tokens within the subject- and object-marking categories as a whole having no potential for ambiguity is presented in Table 25:

	TOTAL SAMPLE N	%	PRI of 0.00 N	%
PRO	176	100	114	65
V-NP	81	100	45	56
NP-V	119	100	32	27

TABLE 25: Percentage of Subject or Object Tokens with PRI Value of 0

This distribution reflects the hierarchy in (23) above: the PRO category, having the highest percentage of non-interference, is also the most continuous category with respect to the previous discourse.

The post-verbal category shows a moderate potential for ambiguity, and thus an intermediate degree of continuity, with nearly half of its tokens showing a PRI value of greater than 0, while the pre-verbal category clearly shows the lowest degree of non-interference from competing referents. As the potential for ambiguity within the clause increases, the more likely it is that the referent will be decoded in the pre-verbal order: to increase the ease of recoverability of the referent, it is fronted in the clause, making it more salient in the discourse.

Across the subject and object case roles, the relative values of PRI do not follow the hierarchy in (24) as to RD value: subjects consistently have a higher PRI than do objects. Although seemingly unexpected in terms of the lower RD of the subject categories, this is a direct result of the distribution of animates in the major case roles, a measure of the topical importance of the referents (Givón 1983). As seen in Table 22, 96% of all subject NP's are animate; the potential for ambiguity in the predication is then greater, as ambiguity results from shared semantic compatibility with the verb, a major feature of which is animacy. The object NP's, on the other hand, contain a large portion of inanimates (48%), and these do not compete directly with the majority of the verbal predications. Thus the PRI for objects is naturally lower than for subjects.

Topical importance, animacy, and persistence of referents: As mentioned above, the distribution of animate vs. inanimate referents in the major case roles is a more or less direct measurement of the topical importance encoded by the case roles. From Table 22, the continuum presented in (24), repeated below, for topic continuity can be reproduced with reference to discourse importance, as measured by the percentage of animates within the case roles, with 96% animates for subjects, 52% for objects, and 6% for locatives:

(24) SUBJECT > OBJECT > LOCATIVE

Discourse importance is also measured in terms of the persistence of the referent in the subsequent discourse. Although the results obtained for the subject categories cannot be directly compared with those of the object and locative categories, due to the differences in the methodology, the values obtained for these two cases are shown to follow (24), with object outranking locative in topical importance. The object categories consistently show higher values of persistence than do the locative categories (Table 13), thus coding more topically important referents.

The two ordering patterns, V-NP and NP-V, discourse importance is scaled as for topic continuity, with V-NP outranking NP-V. The post-verbal order codes the more continuous and important topics than the pre-verbal order.

Of lowest topical importance are the referential-indefinite categories for both subjects and objects. For subjects, these are all in pre-verbal position; within the object categories, the post-verbal order codes extremely unimportant referential-indefinites which die out immediately in the register, while the pre-verbal order codes the relatively more salient referential-indefinite objects.

The subject-marking categories were measured for persistence as subject only. The results obtained correlate to some extent with the positioning of the referent in the thematic unit, though not exactly as predicted in Givón 1983. Pronouns show the highest persistence, though they occur overwhelmingly in paragraph non-initial clauses (93%). As discussed above, this results from their being a major component in equi-subject chains. The post-verbal category shows the lowest persistence, as expected for paragraph non-initial occurrences. The persistence of the pre-verbal category is close to that of the PRO category, a relatively high average value as expected for theme-initial occurrences, the initiators of equi-subject chains.

SS vs. DS, Thematic Continuity, and Continuity of Subjects: The hierarchy of continuity for the grammatical devices expressed in (23) is supported within the subject-marking categories by the additional measures of SS vs. DS and contiguity to thematic junctures. The largest percentage of both SS and thematic non-initial occurrences are in the most continuous category, the unstressed pronouns. The VS-ordered NP's again rank as intermediary, and the least continuous category, the SV-ordered NP's, contain the smallest percentage of both SS and thematic non-initial occurrences; thus occurring more often in the highly discontinuous environments of theme-initial clauses and following DS clauses.

Referential-indefinites, the maximally discontinuous category by definition, has the bulk of its tokens occurring in paragraph *non*-initial clauses. As discussed above, this category codes extremely unimportant referents, and for this reason is highly unlikely to occur paragraph-initially at the start of equi-subject chains.

A Direct Measure of Topic Discontinuity: The Entry of Referents into the Register: The pre-verbal order is the highly preferred order for introducing referents across all case roles. The entry of a referent into the register is the most discontinuous function in terms of topic continuity, and this strongly confirms the pre-verbal order as the most discontinuous of all grammatical devices. As can be seen by the total number of new topics for each case role (Table 19), referents are most often introduced into the register as objects (N=57) and *least* often as locatives (N=17). First mention referents in the subject role (N=40) are intermediate.

Pragmatic Functions of Word Order in Klamath: Word order in Klamath is demonstrated to be pragmatically controlled, with the post-verbal order coding more highly continuous referents, and the pre-verbal order coding more highly discontinuous referents across the major case roles, thus confirming the predictions outlined in Givón 1983. Several functions determine the relative continuity of the two orders: for subjects, the pre-verbal order is used most often for entry and re-entry of referents into the discourse; for potentially ambiguous predications, to aid in the recoverability of the referent by increasing its saliency in the discourse, in switching reference from the preceding clause, and at the sites of thematic junctures. The post-verbal order occurs in conjunction with the pronouns in the absence of the above conditions. For objects and locatives, the pre-verbal order is also used more often for introducing and re-introducing referents, and, for objects, in the presence of interfering referents in the preceding discourse. The post-verbal position for the two non-subject cases is used to code the most continuous referents, as well as the more topically important referents which persist in the subsequent discourse. Referential-indefinites for both subjects and objects tend to precede the verb, unless they are extremely unimportant in the discourse, in which case, for objects, they occur in post-verbal position, typically as an afterthought construction. Word order in Klamath is syntactically free; but as a general rule, unpredictable, potentially ambiguous information is fronted in the clause, thereby increasing its accessibility in the discourse.

NOTES

1) There are other problems of Klamath word order which will not be dealt with in this paper, most notably the fact that noun modifiers occasionally occur on the opposite side of the verb from their head, as in the following example from Barker 1964:315:

nanqa ?a de:Wi wokas p'aLa-tdat
some INDIC leave wokas tray-LOC
'[He] left some wokas on a tray.'

2) The texts are: 1, Old Bear and Antelope, 2, Coyote and Badger, 3, Little Porcupine and Coyote (all by Mrs. Pansey Ohles), 8, Hehji:k'a (Mr. Grover Pompey), 10, The Crater Lake Myth, 26, Killing Fish (both by Mr. Robert David), and 27, Some Historical Incidents (Mrs. Aggie Butler).

3) Citations are to text number and line in Barker 1963.

4) The honk of coy honk occurring here and in many other examples, although morphologically identical to the object form of the demonstrative, apparently functions as a discourse connective of some sort and will not be glossed.

5) One VS existential-presentative construction was omitted from the counts.

6) See Barker 1964:240. Exceptions to the pattern of marking all and only animate objects do occur, but none were found in the texts studied.

7) N in the tables represents the total number of tokens of the type in the data base.

8) Zero anaphora is the other major component.

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A COMPARATIVE SKETCH OF PUEBLO LANGUAGES:
Phonology

Yukihiro Yumitani

Abstract: Pueblo Indians of the American Southwest have lived in a contiguous area for many centuries. Close contacts and bi- or multilingualism in different Indian languages may have led to diffusion of linguistic features across the language boundaries. In an attempt to determine some of the shared phonological traits, this paper compares the sound systems of Pueblo languages.

Introduction

Pueblo Indians have lived close together in the American Southwest for many centuries--some groups have been in contact for at least 1500 to 2000 years. They are culturally homogeneous, but noted for their linguistic conservativism or what Sherzer calls the "compartmentalization" of their languages: "When they do learn other languages, they seem consciously to avoid allowing alien linguistic traits to penetrate their own linguistic system" (Sherzer 1976:244). In other words, Pueblo people appear to remain pretty distinct linguistically in spite of many centuries of contact.

Most of the Pueblo Indians presently use English as a means of communication with people from other pueblos who speak unintelligible Indian languages. This implies unlikelihood of mutual linguistic influences today. However, as Miller (1978:612-13) correctly notes, "[s]ince neither Spanish nor English was available in Pre-Columbian times to mediate inter-pueblo contact, it is likely that bilingualism was somewhat greater than today." So past bilingualism or multilingualism in different Indian languages may well have led to diffusion of linguistic traits from one language to another.

The purpose of this study is to ascertain what linguistic traits, if any, are widespread among Pueblo languages. The languages within the scope of this research are as follows:

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Zuni

Keresan
Western: *Acoma*, Laguna,
Eastern: Zia, *Santa Ana*,
San Felipe, Santo Domingo,
Cochiti

Tanoan
Tiwa (Southern): Isleta
Sandia
(Northern): Picuris
Taos
Towa: *Jemez*
Tewa: Tesuque, Nambe, Pojoaque, San
Ildefonso, *Santa Clara*, San Juan

I chose one language or dialect from each group as representative of that group. These are underlined in the above list.[1]

The focus of the present study is comparative phonology. After a brief introduction to the classification of the languages, I will discuss their sound systems in terms of consonants, vowels, suprasegmentals and phonotactics. The phoneme inventory of each language is presented in the appendix. I owe most of the typological categories employed here to Sherzer (1976) and Kaufman (1977).

Language Relationships

Zuni. Zuni is generally considered a language isolate. In 1929, Sapir included Zuni in his Aztec-Tanoan phylum, along with the Uto-Aztecan and Kiowa-Tanoan groupings (Voegelin & Voegelin 1976:487). George Trager supported this relationship, and in 1951 he proposed Zuni and Kiowa-Tanoan as a branch of Aztec-Tanoan (Davis 1979:410).

Another language grouping to which Zuni is sometimes linked is Penutian. In 1964, Stanley Newman presented evidence for a genetic relationship of Zuni to California Penutian languages (Davis 1979:410). Even if Zuni is related to Uto-Aztecan, Kiowa-Tanoan, or Penutian groups, the relationship must be very remote.

Keresan. Keresan is presently spoken in seven New Mexico pueblos. The language is divided into two main dialects--Western Keresan and Eastern Keresan. The dialectal differences are said to be primarily lexical rather than phonetic or grammatical (Spencer 1946:230).

Keresan is not closely related to any language or language family, and is regarded as a language isolate. Sapir in 1929 included Keresan in his Hokan-Siouan phylum but with no published convincing evidence. In fact, the postulation of Hokan-Siouan phylum itself has gained little, if any, support from other linguists (Davis 1979:411).

Tanoan. The Tanoan language family consists of at least three language groups--Tewa, Tiwa and Towa. (Only these three are represented in the present study.) Tewa is spoken in six Rio Grande Valley pueblos in New Mexico. The differences among the dialects are minor and they are mutually intelligible. Tewa is also spoken by descendants of these Pueblo people living among the Hopi in Arizona (the so-called Hopi-Tewa). There are marked differences between this and the Rio Grande Valley dialects "in areas of vocabulary, phonology, and grammar, although a degree of mutual intelligibility is retained" (Davis 1979:405).

Tiwa is divided into two groups--Northern Tiwa (Taos, Picuris) and Southern Tiwa (Isleta, Sandia). Taos and Picuris are considered by some linguists to be separate languages, while Isleta and Sandia are mutually intelligible dialects of the same language (Davis 1979:404).

Jemez is the only extant member of the Towa branch. The now extinct Pecos could be another Towa dialect, or it may have been a fourth Tanoan language.

The Tanoan languages are related to Kiowa, a Plains language now spoken in Oklahoma. The relationship was first postulated by J. P. Harrington in 1910, and these languages constitute the well-established Kiowa-Tanoan language grouping. Sapir considered Kiowa-Tanoan to be related to Uto-Aztecan and postulated an Aztec-Tanoan phylum. If the two language families are actually related, it is a very remote relationship (Hale & Harris 1979:171).

Consonants

Stops and Affricates. Five Pueblo languages have voiceless and voiced stop series. The languages are: Santa Ana, Sandia, Jemez, Santa Clara, and Taos. All but Santa Ana are Tanoan languages, and Kiowa, another member of the Kiowa-Tanoan family also has this contrast between stops. It may be that the voicing distinction for stops is a Kiowa-Tanoan family trait, although the distributions of /d/ and /g/ in Sandia, and /b/,/d/ and /g/ in Taos are very limited in native words.[2] Likewise, the voiced stops in Santa Ana only appear in loanwords, e.g., benta:na 'window' (Davis 1964:61).

The aspirated/unaspirated stop series are found in Keresan (Acoma, Santa Ana) and all the Tanoan languages except Santa Clara.[3] (Kiowa has these two series of stops too.) In Keresan, aspiration contrast also occurs with affricates.

The presence of glottalized stops (ejectives) and glottalized affricates seems to be a universal areal trait of the Pueblo area.[4]

Labialized velar stop (/k^w/) is found in all but Keresan languages.[5] The development of this phoneme in the Tanoan languages may be an innovation--possibly due to an influence from Navajo--since it is not present in Kiowa.

Keresan (Acoma, Santa Ana), Jemez, and Santa Clara also have a palatalized stop /t^y/. Its absence in Tiwa (Sandia, Taos) and Kiowa suggests that Jemez and Santa Clara may have developed this phoneme through contact with Keresan groups.

Three languages, i.e., Zuni, Keresan (Acoma, Santa Ana), and Santa Clara Tewa, possess both /c/ and /č/--plain or modified.

Retroflexed affricates are found only in Keresan.

Spirants. The voiced/voiceless opposition in spirants is present only in Jemez (/f/~/v/, /s/~/z/) and Santa Clara (/f/~/v/). Considering the fact that Kiowa has /s/ and /z/, the lack of voiced fricatives in Tiwa (Sandia, Taos) and other Pueblo languages may constitute an areal trait.[6]

Glottalized spirants are found in Keresan (Acoma, Santa Ana). Keresan is also the only language group which possesses retroflexed spirants.

All Tanoan languages have labialized velar or glottal fricatives: Sandia (/h^w/), Jemez (/h^w/), Santa

Clara (/x^w, h^w/), Taos (/x^w/).[7] These sounds may be an innovation of the Tanoan languages since Kiowa does not possess any labialized fricative. One possible source for these fricatives in Tanoan languages is Navajo. (Navajo has both /x^w/ and /h^w/ as well as /k^w/ (Sapir & Hoijer 1967).)

Labial fricatives occur only in Tanoan languages: Sandia (/f/), Jemez (/f, v/), Santa Clara (/f, v/), Taos (/f/). Except for Jemez /v/ and Santa Clara /f, v/, all the labial spirants are found only in Spanish and English loanwords.[8] Incidentally, Kiowa does not have a labial fricative.

The interdental fricative /θ/ is present only in Santa Clara. Santa Clara Tewa is the only Tanoan language without the aspirated stop series, and /θ/ may derive from /t^h/.[9]

As for velar fricatives, Santa Clara and Taos have both /x/ and /x^w/. Neither Kiowa nor any other Tanoan languages have velar spirants.

Four languages, i.e., Zuni and all the Tanoan languages but Santa Clara Tewa, have a lateral fricative. Navajo, which has lateral affricates as well as a lateral sibilant, may have been a factor in the development of a lateral spirant in these Tanoan languages. (Kiowa only has a voiced lateral--not fricative.)

Liquids. It seems that most of the Pueblo languages originally had only one plain liquid (/l/ or /r/), and that the development of a second liquid consonant in languages such as Santa Ana, Sandia, Jemez, and Taos, is a recent innovation, due to bi- or trilingualism in the tribal language and Spanish and/or English. The second liquids in these languages occur only in recent loans: Santa Ana (/l/), le:ba 'coat' (< Sp. *leva*); Sandia (/l/), làlúna 'levis; blue jeans' (< Sp. *pantalones* ?); Jemez (/ɾ/), móɾɔ 'blackberry' (< Sp. *mora*); Taos (/r/), rancuʔuna 'ranch' (< Sp. *rancho*).

It is to be noted that only the languages which have /l/--native or borrowed--possess lateral fricative /ɬ/, i.e., Zuni, Sandia, Jemez, and Taos.

Nasals. What is common among the Pueblo languages with the exception of Santa Clara is that they have only two nasal consonant phonemes, i.e., /m, n/. Santa Clara has /ñ/ in addition to these.

Also, a glottalized nasal series is present only in Keresan (Acoma, Santa Ana).

Semivowels. Except for Keresan which has plain and glottalized semivowel series, all the Pueblo languages have two semivowels, i.e., /w, y/.

Summary. Some of the findings discussed above are summarized in Table 1 below. In this table, three kinds of markers are used. If a certain trait is unquestionably present in a language, I marked it with an asterisk (*). If the presence of a feature is controversial due to differences in opinion among scholars (e.g., treatment of glottalized stops), it is marked with a question mark (?). If a feature developed rather recently--typically through contact with European languages--I placed "R" in the appropriate column.

Table 1. Consonantal Traits in Pueblo Languages.

	Zuni	Acoma	S.A.	San.	Jemez	S.C.	Taos
vd/vl			R	*	*	*	*
asp/unasp		*	*	?	*		?
glottalized	?	*	*	?	*	*	?
labialized	*			?	*	*	?
palatalized		*	*		*	*	
retroflexed		*	*				
lateral fricative	*			*	*		*
liquids	l	r	r(l)	r l	l(r)	r	l(r)

Note: S.A. = Santa Ana; San. = Sandia; S.C. = Santa Clara.

Glottalization of consonants is the only universal areal trait, found in all the Pueblo languages.

The second most common feature is aspiration contrast with respect to voiceless stops. This feature is only absent in Zuni and Santa Clara.

Labialization of consonants--particularly /k^w/--occurs in all the languages except Keresan.

Palatalized stops are also common, but they do not occur in Zuni, Sandia, and Taos.

As for liquids, all the languages in the Pueblo area originally had only one liquid, but through contact with languages such as Spanish and English, several languages have come to have a second liquid. Its occurrence is limited to loanwords.

A lateral fricative is present in Zuni and most Tanoan languages. It does not occur in Keresan and Santa Clara.

Labial fricatives are found in four languages--all Tanoan. The labial fricative in Sandia and Taos, however, occurs only in loanwords.

Among the less widespread traits is retroflexion. Retroflexed affricates and sibilants occur only in Keresan.

Vowels

Number of Plain Vowels. "Plain vowels" are defined here as short, oral, voiced vowels. All the non-Tanoan languages have five plain vowels. On the other hand, Tanoan languages except Sandia have six.[10] It appears that Sandia lost a vowel, since all the other Kiowa-Tanoan languages have six plain vowels.

Devoicing. Only Santa Ana Keresan has an opposition of voiced/voiceless vowels. As for Acoma, Miller (1965:16) writes:

> A vowel can be devoiced if it is final or followed by a devoiced syllable . . . and comes after the last accented syllable; the devoicing is in part conditioned and in part in free variation.

However, Maring (1967) sets up voiceless vowels as separate phonemes in Acoma.

Nasalization. All the Tanoan languages possess nasalized as well as oral vowels. This is probably a family trait of Kiowa-Tanoan.

Length Distinction. All the Pueblo languages except Sandia and Taos phonemically distinguish vowel length. It may be that the Tiwa languages have lost the length distinction.[11] (Kiowa also has short/long vowels.)

Summary. The most common trait as regards vowels is the length distinction. It occurs in all but Tiwa (Sandia, Taos). Although absent in the language of older Sandia speakers, vowel length is becoming phonemic for younger speakers of this language.

Oral/nasalized vowel distinction is probably a family trait of Kiowa-Tanoan. It is not found in any other Pueblo languages.

Table 2. Vowel Traits in Pueblo Languages.

	Zuni	Acoma	S.A.	San.	Jemez	S.C.	Taos
vd/vl		?	*				
oral/nasal				*	*	*	*
length	*	*	*	R	*	*	

Suprasegmentals

Zuni is the only Pueblo language which does not have any suprasegmental phoneme. It has stresses (strong, weak), but their occurrence is predictable. The strong stress "falls on the first syllable of the word unit" and "[a]ll other syllables have the weak stress" (Newman 1965:14).

All the other languages have phonemic tones or stresses--sometimes both of them. According to Miller (1965:8-9), Acoma has "tonal accents" (high, falling, glottal) which primarily carry a pitch function. Maring (1967:1) argues, however, that the language has two phonemic stresses (strong, weak) and that pitch differences arise due to different degrees of amplitude in stresses.

On the other hand, Santa Ana reportedly has four kinds of accent (level, falling, breathy, glottal) (Davis 1964:63).

As for Tanoan languages, Sandia has three tones (high, mid, low) and three stresses (primary, medial, weak), while Jemez has two tones (high, low). Santa Clara possesses stress and pitch accents (high, mid, low, falling, weak), and only syllables with a strong stress make pitch distinctions. Finally, Taos has three phonemic tones (high, normal, low).

In summary, although there is yet much to be known about suprasegmentals of these Pueblo languages, it seems that some kind of tones play an important function in the majority of the languages.

Restrictions on the Distribution of Vowels and Consonants

In Zuni, all the syllables must begin with a consonant or a consonant cluster. The only syllable-initial clusters permitted are /$k^{ʔ}$, $k^{wʔ}$, $c^{ʔ}$, $\check{c}^{ʔ}$/.[12] Syllables with these phonemes as initial clusters can only occur word-initially. A vowel, a consonant, or a consonant cluster (two consonants) may end a syllable. Of all the consonant clusters found in Zuni, geminate consonants are most common and noteworthy. Unlike the relatively free distribution of consonants, the only possible vowel clusters are geminate (long) vowels.

Acoma syllables must also start with a consonant or a two-consonant cluster. Only a vowel or a two-vowel cluster may end a syllable. The second member of vowel clusters is always /i/ or /u/. Most consonant clusters consist of /s/ + a stop, and clusters of a nasal + a plain stop can occur in non-initial positions of loanwords or probable loanwords, e.g., sántu 'saint' (Miller 1965:9).

The phonotactics of Santa Ana reported in Davis (1964) is very similar to that of Acoma. One difference found in Santa Ana is that glottal stop /?/ as well as a vowel may terminate a syllable. Syllables ending in a nasal are found in a few loanwords, e.g., nárán 'orange' (< Sp. naranja) (Davis 1964:59). Some loanwords also contain a cluster of a stop + /r/ or

/l/, e.g., plâ:sA 'city' (Davis 1964:61). Voiceless vowels do not occur syllable-initially.

In Sandia, only a consonant or a consonant cluster may begin a syllable, while a syllable may terminate in a vowel or a consonant. The only consonants which may end a syllable are /b, d, g, m, n, l, r, y, w/. Word-medial consonant clusters normally consist of two consonants, except in loanwords, e.g., ʔalámbri 'wire' (< Sp. alambre) (Brandt 1970:92). The only vowel clusters found are /ie, ia, əa, ue, ua, įę, ə̨ą/. No geminate vowels occur in Sandia. (See Note 11.)

Unlike other Pueblo languages, Jemez has many syllables beginning with a vowel, although CV syllables are most common (Martin 1964:26). A vowel or a consonant may end a syllable. The permitted syllable-final consonants are /?/ and /š/. All consonant clusters consist of /?/ + /m, n, y, w, l/.[13] Vowel clusters occur only at syllable boundaries.

In Santa Clara, a consonant usually begins a syllable. Vowel-initial syllables occur but are rare (Hoijer & Dozier 1949:139). Syllables may terminate in a vowel or a consonant. The consonants which may occur in this position are /n, h, ?/ (Hoijer & Dozier 1949:143). Consonant clusters occur only word-medially. The same thing is true of vowel clusters.

Finally, in Taos only a single consonant may begin a syllable, except for recent loanwords from Spanish and English which have initial consonant clusters such as /pl, pr, tr, kl, kr, fr/ (G. Trager 1946:191). A syllable may end in a vowel, a consonant (sonorant), or a consonant cluster (a sonorant + a voiced stop). The consonant clusters occur only word-finally and are very rare. The permitted vowel clusters are /ie, ia, uo, əo, įę/. There are no phonemic long vowels in Taos.

It is noteworthy that recent loans from Spanish and English have caused a change in the phonological structures of many Pueblo languages.

Conclusion

The previous discussion revealed some common linguistic features among the Pueblo languages. In discussing shared phonological traits, I speculated on where the traits might have come from, but sometimes I could not determine the source of diffusion. This is partly because I did not study all the neighboring languages in the Southwest: I only referred to Kiowa and Navajo. I did not include in the present survey Pueblo languages spoken in Arizona (i.e., Hopi and Hopi-Tewa). But even if I investigated all the Pueblo and neighboring non-Pueblo languages, I would still have to face a serious constraint. Neither Zuni nor Keresan has a closely-related language in any other non-contiguous area. It is difficult to determine whether a certain areal trait present in these languages is original or borrowed. In this sense, Tanoan languages are in a slightly better situation since they have a sister language, Kiowa, in another culture area.

Generally, most of the languages investigated in this study need more and better descriptive work. This is especially true of the fields of syntax and semantics, but even the morphological studies that I have looked at, many of them are sketchy. In addition, dictionaries are essential if we are to do a thorough comparative study of any languages.

Areal linguistic studies can provide an important clue to the history of cultural contact in an area. They may also contribute to the understanding of languages in general--for instance, they may help us obtain further insight into what linguistic features are more likely to be diffused than others.

The study of Pueblo languages in particular has yet another sort of significance. Many of these Indian languages are still viable, and this makes it possible to study on-going changes--not only microlinguistic but also sociolinguistic processes--occurring in languages in a contact situation. In my opinion, the Pueblo area is one of the best places for studying linguistic acculturation. The present survey is just a small step in that direction.

NOTES

1. The primary sources of the data used in this study are as follows:

Zuni--Newman (1965).
Acoma (W. Keresan)--Miller (1965), Maring (1967).
Santa Ana (E. Keresan)--Davis (1964).
Sandia (S. Tiwa)--Brandt (1970).
Taos (N. Tiwa)--G. Trager (1944, 1946, 1948).
Jemez (Towa)--Martin (1964).
Santa Clara (Tewa)--Hoijer & Dozier (1949),
Speirs (1966).

The data on Kiowa and Navajo were obtained from Watkins (1984) and Sapir & Hoijer (1967), respectively.

2. These phonemes normally occur word-initially in Spanish loanwords (see Brandt (1970:82) and G. Trager (1946:196-97)).

3. Brandt (1970) on Sandia and G. Trager (1948) on Taos treat the aspirated stops as clusters of a voiceless unaspirated stop plus /h/. They apply the same principle to the treatment of glottalized stops as well (i.e. a plain stop plus /ʔ/).

4. Newman considers /$k^{ʔ}$, $k^{wʔ}$, $c^{ʔ}$, $č^{ʔ}$/ to be consonant clusters with the glottal stop as the second (or last) member (Newman 1965).

5. Again Brandt (1970) and G. Trager (1948) treat this phoneme as a cluster of /k/ and /w/.

6. Hale, however, reconstructed only the voiceless fricative /*s/--other than /*h/--for proto-Kiowa-Tanoan (Hale 1967:115).

7. Brandt (1970) and G. Trager (1948) take Sandia /h^{w}/ and Taos /x^{w}/, respectively, to be cluster phonemes. Martin claims that Jemez /h^{w}/ is a labialized glottal fricative, but also states that [h^{w}], an allophone of the phoneme, "often fluctuates freely with an allophone [f^{w}]" (Martin 1964:18). "/h^{w}/" may actually be the voiceless bilabial fricative /ᵽ/.

8. /f/ and /v/ in Santa Clara "vary from the bilabial to the dento-labial position of articulation; the latter probably more frequent among the younger Tewa speakers" (Hoijer & Dozier 1949:141). These phonemes occur in native words, but their actual pronunciation among younger people is apparently influenced by English pronunciation.

9. /θ/ varies "from heavily aspirated apico-dental stop [t̪ʰ] to apico-interdental fricative [θ]" (Speirs 1966:47).

10. Isleta, the other dialect of Southern Tiwa, also has five plain vowels (Leap 1970).

11. Among younger speakers of Sandia, there is a tendency to substitute a long vowel for low tone; thus vowel length has become phonemic for them (Brandt 1970:89-90).

12. Newman (1965), as was mentioned earlier, treats the phonemes as consonant clusters. If they are treated as unit phonemes instead, all the syllables in Zuni must begin with a *single* consonant.

13. This could be an influence from its neighbor language, Keresan, which has glottalized sonorants.

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APPENDIX: PHONEME CHARTS

In the following charts, some phonemic symbols are enclosed within braces {}, while others are placed in parentheses (). The symbols enclosed in braces represent phonemes whose status is uncertain--whether they are unit phonemes or cluster phonemes. The phonemes within parentheses are recently-borrowed phonemes: they occur in loanwords from Spanish and English.

Zuni

p	t			k	k^w	ʔ
				{$k^{ʔ}$	$k^{wʔ}$}	
		c	č			
		{$c^{ʔ}$	$č^{ʔ}$}			
	s		š			h
	ɬ					
	l					
m	n					
w			y			

i		o
e		u
	a	
i:		o:
e:		u:
	a:	

Acoma (Western Keresan)

p	t	t^y		k	ʔ
p^h	t^h	t^{yh}		k^h	
$p^{ʔ}$	$t^{ʔ}$	$t^{ʔy}$		$k^{ʔ}$	
	c	(č)	ç		
	c^h	$č^h$	$ç^h$		
	$c^{ʔ}$	$č^{ʔ}$	$ç^{ʔ}$		
	s	š	ṣ		h
	$s^{ʔ}$	$š^{ʔ}$	$ṣ^{ʔ}$		
	r				
	${}^{ʔ}r$				
m	n				
${}^{ʔ}m$	${}^{ʔ}n$				
w		y			
${}^{ʔ}w$		${}^{ʔ}y$			

i	ə	u
e		
	a	
i:	ə:	u:
e:		
	a:	

Santa Ana (Eastern Keresan)

p	t		t^y	k	ʔ
p^h	t^h		$č^h$	k^h	
$p^ʔ$	$t^ʔ$		$č^ʔ$	$k^ʔ$	
(b)	(d)			(g)	
	c	c̣	(č)		
	c^h	$c̣^h$			
	$c^ʔ$	$c̣^ʔ$			
	s	ṣ	ś		h
	$s^ʔ$	$ṣ^ʔ$	$š^ʔ$		
	(l)				
	r				
	^ʔr				
m	n				
^ʔm	^ʔn				
w			y		
^ʔw			^ʔy		

i	ə	u
e		
	a	

i:	ə:	u:
e:		
	a:	

I	Ǝ	U
E		
	A	

Sandia (Southern Tiwa)

p	t			k	{kʷ}	ʔ
{pʰ	tʰ			kʰ}		
{pˀ	tˀ			kˀ	kˀʷ}	
b	d			g		
			č			
			{čˀ}			
(f)		s	š			h {hʷ}
		ł				
		l				
		r				
m	n					
w			y			

i	ə		u
e			
		a	
į	ə̨		ų
ę			
		ą	

Jemez (Towa)

p		t		t^y	k^w		?
$p^?$		$t^?$					
		t^h			k^h	k^{yh}	
					$k^?$	$k^{?y}$	
b		d			g	g^y	
			č				
			$č^?$				
			j				
h^w(f)		s	š				h
	v	z					
		ł					
		l					
		(r)					
m		n					
w					y		

i	i:	ɨ	ɨ:
e	e:	o	o:
æ	æ:	ɔ	ɔ:
į	į:	ɨ̨	ɨ̨:
		ǫ	ǫ:
æ̨	æ̨:	ɔ̨	ɔ̨:

Santa Clara (Tewa)

p		t	t^{y}	k	k^{w}	ʔ	
$p^{ʔ}$		$t^{ʔ}$		$k^{ʔ}$	$k^{ʔw}$		
b		d		g			
			č				
		c					
		$c^{ʔ}$	$č^{ʔ}$				
			ǯ				
f	θ	s	š	x	x^{w}	h	h^{w}
v							
		ɾ					
m		n	ñ				
w			y				

i	i:	u	u:
e	e:	o	o:
ɛ	ɛ:		
a	a:		
į		ų	ų:
ɛ̨	ɛ̨:		
ą	ą:		

Taos (Northern Tiwa)

p	t	c	k	{k^{w}}	ʔ
{p^{h}	t^{h}}				
{$p^{ʔ}$	$t^{ʔ}$	$c^{ʔ}$	$k^{ʔ}$	$k^{ʔw}$}	
b	d		g		
(f)	ł	s	x	{x^{w}}	h
	l				
		ɾ			
m	n				
w			y		

i		u
e		ə
a		o
į		ų
ę		ǫ
	ą	

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